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ABSTRACT

Grades of 1982 Clemson graduates in various academic majors were studied. In addition to determining whether grade inflation occurs differentially across majors, the position of education majors was compared to that of other majors. The following 10 majors were assessed: early childhood education, elementary education, secondary education/science teaching, electrical engineering, mechanical engineering, English, psychology, nursing, mathematics, and microbiology. Sixty-five percent of the students in each major, or a total sample of 256 students, were studied. Each course was classified into the following categories: core courses, program courses, other required courses, and electives. In addition to comparing grade-point ratios (GPRs) for the four categories of courses, students' total Scholastic Aptitude Test scores were assessed. Only 4 of the 10 majors had GPR means lower than the overall mean GPR. Fifty-seven percent of the 256 students had GPRs above 3.0. This percentage is higher than the approximately 45 percent of all students who graduated with honors in 1978 and 1979. Furthermore, grade inflation was found in all majors to some extent. Additional findings are analyzed, and extensive statistical data on grades for each major are included. (SW)

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A STUDY OF GRADE INFLATION
IN TEN MAJORS AT CLEMSON UNIVERSITY

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A STUDY OF GRADE INFLATION IN TEN MAJORS AT CLEMSON UNIVERSITY

Introduction

Grade inflation has been a serious concern for institutions of higher learning since the mid-1960s (Hoover and Schroeder, 1976; Birnbaum, 1977). It became such a problem at Clemson University that in 1980 standards for graduating with honors were raised after it was discovered that approximately forty-five percent of all 1978 and 1979 degree candidates graduated with honors.

On the surface, this seemed like a needed reform as school officials and faculty searched for higher standards of quality. However, this change only reduced the number of honor graduates; it did not get at the heart of the problem of grade inflation. Rather, it may have obscured it, thus producing a false sense of higher quality.

The complex problem of grade inflation belies simple solutions. It involves a careful, deliberate examination of at least four separate but interrelated questions:

1. What is grade inflation? This is a definitional question.
2. Where does grade inflation reside in the university academic structure? This is an empirical question.
3. What causes grade inflation and how can it be explained? This is an etiological question.
4. What should be done about grade inflation? This is a philosophical question.

Attempts to answer all of these questions go beyond the scope of this study. An answer to the definitional question is assumed and the well-established fact is accepted that grades of college students are higher than in the past. This study is intended as one small step in dealing with the empirical question by investigating and comparing grades of a sample of Clemson University graduates across several academic majors. The intent is threefold: First, to examine grade distributions to determine if grade inflation is a differentially-occurring phenomenon across majors, second, to discover the position of Education majors in comparison with other majors and relative to expectations derived from SAT scores; and third, to provide a research model for future investigations which might be helpful in seeking answers to the etiological and philosophical questions.

Background

The major impetus for this study was an article published in the Clemson student newspaper, The Tiger, on April 7, 1978, in which grade distributions for fall semester of 1977 were given for all colleges in the University. Colleges were ranked as to the highest percentages of A's and B's given as follows: Education, Agriculture, Nursing, Architecture, Forest and Recreation, Liberal Arts, Engineering, Industrial Management and Textile Science, and Sciences.

Several Clemson University administrators quoted in the article offered opinions on the grade distributions. The Dean of Undergraduate Studies stated that one should not expect to see a correlation between colleges since each could justify its own grade distribution. The Vice-President for Academic Affairs remarked that if the faculty in the various colleges felt that their students were doing well in what was demanded of them, then grade distributions were no problem. One school official suggested that grades are high in general because the University is getting better students each year. The Dean of the College of Education put forth the argument that students taking education courses were juniors and seniors who could be expected to make more A's and B's. The point was made that there was some inequity in comparing the College of Education to Liberal Arts or Sciences where so many freshman and sophomore introductory courses were taught.

These comments raised some rather interesting empirical as well as philosophical questions, particularly in light of an informal investigation of the percentage of students in each college who graduated with honors in May of 1978. A ranking of colleges by highest percentage of honor graduates revealed the following positions: Sciences, Education, Liberal Arts, Engineering, Architecture, Agriculture, Nursing, Industrial Management and Textile Science, and Forestry and Parks Recreation.

It was discovered that there was no correlation between the rankings by grade distributions in The Tiger article and the percentage of students graduating with honors. The College of Sciences, which was ranked last among the nine colleges in the percentage of A's and B's given in the fall of 1977, ranked first in the number of its majors who graduated with honors in May, 1978 (See Appendix A).

It became apparent from these rather informal investigations that there was something in the grading patterns within the University which could not be discovered through a simple comparison of grade distributions or percentages of honor graduates. It was decided, therefore, that a more systematic and refined study should be done comparing grades given to majors of several colleges rather than grades given to all students taking courses within a college. The present study was conceived in the summer of 1982 and data collection was begun in the fall of 1982.

Selection of Subjects

The population of subjects in this study was comprised of all undergraduate students listed in the Commencement Program, May 7, 1982, who were candidates for undergraduate degrees. An ideal situation would have been to select all students in all majors of all colleges for inclusion in the study. However, inasmuch as information about specific courses and grades for students was not available in computer files in the form necessary for the objectives of this study, it was necessary to obtain this information from transcripts which had to be manually reproduced by personnel in the Office of the Registrar. Since the time and cost of copying transcripts for all graduates were prohibitive, it was agreed that approximately 250 transcripts could be provided for this study. Selection of subjects within majors across colleges was done within the constraints of this limitation. The final sample of subjects consisted of 256 students chosen at random from ten majors in five colleges of Clemson University.

Since the study was being conducted in the College of Education, selection of education majors was a prime concern. Other majors were chosen because of their similarities or differences when compared to education. In addition to the College of Education, the Colleges of Engineering, Liberal Arts, Nursing, and Sciences were selected as the basic units for securing subjects.

One consideration in choosing these comparison colleges was the discrepancies in grades assigned in the fall of 1977 and the number of their graduates receiving honors in 1978. While the comparison colleges were in the lower one-half in top grades assigned, they (with the exception of Nursing) were in the upper one-half in percentage of honor students.

Nursing was selected because of its similarity to Education in the percentage of female students and because both are considered to be "helping professions." Liberal Arts and Sciences were likely candidates because education majors take many of these courses and Secondary Education majors have teaching specialities in them. Engineering was chosen because the course work and career opportunities are quite different from those in education.

The choice of majors within colleges was limited to those which had enough graduates to allow for a random selection and still have a sample large enough for statistical analysis. Where there were several majors which fit these criteria, a random selection was made.

The following majors were selected for inclusion in this study: College of Education--Early Childhood Education, Elementary Education, and Secondary Education/Science Teaching; College of Engineering--Electrical Engineering and Mechanical Engineering; College of Liberal Arts--English and Psychology; College of Nursing--Nursing, and College of Sciences--Mathematical Sciences and Microbiology.

There were approximately 400 students in these ten majors. Since the Office of the Registrar could provide 250 transcripts, it was decided to randomly select sixty-five percent of the students in each major. This produced a sample of 256 subjects whose names were submitted to the Registrar for transcripts (See Appendix B).

Preparation of Data for Analysis

The nature of this study and the types of questions to be asked necessitated a transformation of transcript data to some other form. A survey of programs of study in the undergraduate catalog suggested a pattern for a model to use in making comparisons of students. It was decided that each course taken by a student would be classified into one of four categories:

1. Core Courses--those which all students took regardless of major;
2. Program Courses--those taught exclusively by the department offering the degree;
3. Other Required Courses--those required for the degree but taught outside the department offering the degree, including general education requirements;
4. Electives--those classified as free electives.

Two points should be made about this method of classifying courses: First, a course which might be listed in one category for students in one major might be listed in another category for students in a different major; second, all students in all majors did not take the same Core Courses although the types of courses were the same (See Appendix C).

Similar approaches were used in other studies of grade patterns. Boldt (Schoenfeldt and Brush, 1975) used factor analysis of separate course grades in an attempt to determine variations in grades of law and business students. Humphreys (1968) and Humphreys and Taber (1973) analyzed grades over successive quarters in studies of the predictive effectiveness of pre-admission variables. Schoenfeldt and Brush (1975) examined grades of freshmen in twelve different substantive areas (e.g., fine arts, biological sciences, education, humanities, agriculture) in an attempt to determine if GPR is a unitary or multifaceted composite. The approach in this study differs from those used in earlier studies in that it classifies courses by types in an effort to discover where grade inflation resides and if it is differentially distributed across majors.

A computer form was developed for each academic major included in the study. The form included the following information:

1. Indentification number, indication of the major, the student's number within the major determined by alphabetical order, sex, and residency. This latter category identified a student as Full Resident, (one who entered Clemson as a freshman and took all courses at Clemson); Partial Resident (one who entered Clemson as a freshman but took some courses elsewhere); and Transfer (one who transferred to Clemson from another institution).

2. SAT scores, including total, verbal, and mathematical.
3. Rank in graduating class.
4. Courses categorized as Core, Other Required, Program, and Elective along with credit hours and a grade for each course.

All course prefixes were transformed into four-letter designations for ease in computer storage and analysis.

The three investigators in the Department of Elementary and Secondary Education divided transcripts and transferred student information to computer forms. Transcripts and completed computer forms were exchanged so that one other investigator verified the data. Discrepancies were mutually corrected.

Analysis of Data

The data were analyzed using the Statistical Analysis System in the Clemson University Computer Center. Comparisons were tested by analysis of variance and, where possible, by analysis of covariance using total SAT scores as a covariate. Fine-grain analyses comparing majors were done using Duncan's Multiple Range Test. The alpha level for testing hypotheses was set at the 0.01 level of significance.

Mean scores were computed and compared for each major for the following variables:

1. Total score on the Scholastic Aptitude Test (SAT-TOTAL);
2. A grade-point ratio for Core Courses (GPR-CORE);
3. A grade-point ratio for Other Required Courses (GPR-OTH REQ);
4. A grade-point ratio for Program (GPR-PROG)
5. A grade-point ratio for Elective Courses (GPR-ELEC);
6. A grade-point ratio for all courses (GPR-TOTAL):
7. A grade-point ratio for Program Courses at the 300-400 level;
8. A grade-point ratio for Program Courses of Education majors with the grade for student teaching removed.

Residency groups were compared using total GPR and total SAT with no regard for major and sex.

Limitations and Delimitations of the Study

The following limitations and delimitations in this study should be considered when interpreting results within a major and, particularly, when making comparisons across majors:

1. Only 256 of 1192 graduates in the Class of 1982, who graduated in May 1982, are included in this study;
2. Only five colleges are represented;
3. Only ten majors of a total of forty-three are represented. (Secondary Education and Science Teaching were considered as one major for this study inasmuch as all these students take the same education courses. Their teaching major courses were included in the Other Required Courses category);
4. Only seven departments are represented;
5. Males and females are not equally distributed across majors. There are substantially more females in Education, Nursing, and English and substantially more males in Electrical and Mechanical Engineering. Therefore, sex and major are confounded in this study;
6. Although each student's grade-point ratio is computed on Clemson courses only, all students do not have the same number of courses taken at Clemson. Therefore, those students classified as Partial Residents or Transfers have GPR's computed on fewer courses than those in the Full Resident category;
7. The courses used in computing the Core Courses grade-point ratio vary considerably across the ten majors in this study.

Hypotheses to be Tested

The following sets of null hypotheses will be tested in this study:

1. There will be no statistically significant differences in SAT-TOTAL for the majors in this study. In looking at grade inflation, one consideration is a comparison of SAT scores which provide some estimate of a student's background and serve as a point of relative expectation for academic success in college;
2. There will be no statistically significant differences among the ten majors when computed on
    a. GPR-TOTAL:
    b. GPR-TOTAL with SAT-TOTAL as a covariate;
    c. GPR-TOTAL with the student teaching grade removed from education majors' grade-point ratio;
    d. GPR-TOTAL with the student teaching grade removed and with SAT-TOTAL as a covariate.

One of the primary questions in this study was the degree to which grades are differentially distributed among degree programs: that is, do some majors have higher mean GPRs than others? This question was addressed using three different procedures: (1) Analysis of variance would be used in order to include all subjects even if it were found that majors differed in mean SAT scores ; (2) Analysis of covariance would be used in order to provide a more precise analysis and, when possible, to control for the effects of SAT scores; (3) Student teaching would be removed from education majors'

GPRs to see if this 12-hour credit grade unduly influenced the comparison of education majors with other majors.

3. There will be no statistically significant differences among majors when compared on
   a. GPR-CORE;
   b. GPR-CORE with SAT-TOTAL as a covariate.

   Although the set of Core Courses is not exactly the same for all majors, it is the closest that one can come to finding a "common component" for comparing majors.
4. There will be no statistically significant differences among majors when compared on
   a. GPR-OTH REQ;
   b. GPR-OTH REQ with SAT-TOTAL as a covariate.

   Following the grade-point ratio for Core Courses, this measure ranks next in line for commonality across programs inasmuch as it includes most other general education requirements.
5. There will be no statistically significant differences among majors when compared on
   a. GPR-ELEC;
   b. GPR-ELEC with SAT-TOTAL as a covariate.
6. There will be no statistically significant differences among majors when compared on
   a. GPR-PROG;
   b. GPR-PROG with SAT-TOTAL as a covariate;

c. GPR-PROG with student teaching removed from education majors' grades;

d. GPR-PROG with student teaching removed and with SAT-TOTAL as a covariate;

e. GPR-PROG for 300-400 level courses with SAT-TOTAL as a covariate;

f. GPR-PROG for 300-400 level courses with student teaching removed from education majors' grades;

g. GPR-PROG for 300-400 level courses with the student teaching grade removed and with SAT-TOTAL as a covariate.

Another basic question in this study was the degree to which majors differed when compared by grades received only on courses taken within the major department. Furthermore, since some departments require primarily 300-400 level courses in their program majors while others also include 100-200 level courses, it was decided that a comparison should be made using only 300-400 level courses. The removal of the student teaching grade and the use of SAT as a covariate have already been explained.

7. There will be no statistically significant differences between GPRs computed on program courses and those computed on non-program courses within each major. While Hypotheses 6a-g were concerned with comparing GPRs across majors, this hypothesis is testing the comparison between program and non-program courses within a major. The intent is to discover the

degree to which grades received for the courses taught exclusively in a department differ from those received in courses not taught in the department.

8. There will be no statistically significant differences among the three residency groups when compared on
   a. GPR-TOTAL;
   b. GPR-CORE;
   c. GPR-OTH REQ;
   d. GPR-ELEC;
   e. GPR-PROG;
   f. SAT-TOTAL

   The question addressed by this hypothesis is the degree to which residency is related to GPR and SAT. Could differences in majors be caused to some degree by the residency status of the students?

Results

Null Hypothesis 1 stated that there would be no significant differences among SAT-TOTAL of majors in the ten programs compared in this study. Analysis of variance produced an F-value of 11.33 with 9 and 215 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-1). Therefore, Null Hypothesis 1 was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Electrical Engineering, Microbiology, Mechanical Engineering, Mathematical Sciences, and Psychology, while not differing from each other, differed significantly from Secondary Education, Nursing, Elementary Education, and Early Childhood Education. These latter four did not differ from each other. English differed significantly from Elementary Education and Early Childhood Education but did not differ from the other majors (See Appendix E for Matrix E-1).

Null Hypothesis 2a stated that there would be no statistically significant differences among GPR-TOTAL for majors in this study. Analysis of variance produced an F-value of 2.66 with 9 and 246 degrees of freedom which was significant beyond the 0.01 level (See Appendix D for Source Table D-2). Therefore, Null Hypothesis 2-a was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology differed significantly from Elementary Education, Mechanical Engineering, Electrical Engineering, and Nursing. English, Psychology, and Early Childhood Education differed significantly from Nursing. Microbiology did not differ from English, Psychology, Early Childhood Education, Mathematical Sciences, and Secondary Education. English, Psychology, Early Childhood Education, Mathematical Sciences, Secondary Education, Elementary Education, Mechanical Engineering, and Electrical Engineering did not differ from each other (See Appendix E for Matrix E-2).

Null Hypothesis 2-b stated that there would be no statistically significant differences in GPR-TOTAL for majors with SAT-TOTAL used as a covariate. Analysis of covariance produced an F-value of 3.07 with one and nine degrees of freedom which was significant beyond the 0.01 level (See Appendix D for Source Table D-3).

Duncan's Multiple Range Test comparing differences between majors revealed that there were a few changes not indicated when ANOVA alone was used. Microbiology differed significantly from Mechanical Engineering, Electrical Engineering, Secondary Education, Elementary Education, and Nursing. English and Psychology differed from Elementary Education and Nursing. Early Childhood Education differed from Nursing. This analysis saw Mechanical Engineering exchange rank position with Secondary Education and Electrical Engineering exchange rank position with Elementary Education. Furthermore, Secondary Education was different from Microbiology with ANOCOVA but not with ANOVA. English and Psychology were different from Elementary Education in this analysis but not in the former (See Appendix E for Matrix E-3).

Null Hypothesis 2-c stated that there would be no statistically significant differences in GPR-TOTAL among majors with the grade for student teaching removed for education majors. Analysis of variance produced an F-value of 2.64 with 9 and 246 degrees of freedom which was significant beyond the 0.01 level (See Appendix D for Source Table D-4). Therefore, Null Hypothesis 2-c was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology differed significantly from Mechanical Engineering, Secondary Education, Electrical Engineering, Elementary Education, and Nursing. English and Psychology differed from Elementary Education and Nursing. Microbiology did not differ from English, Psychology, Mathematical Sciences, and Early Childhood Education. English, Psychology, Mathematical Sciences, Early Childhood Education, Mechanical Engineering, Secondary Education, and Electrical Engineering did not differ from each other. Mathematical Sciences, Early Childhood Education, Mechanical Engineering, Secondary Education, Electrical Engineering, Elementary Education, and Nursing did not differ from each other (See Appendix E for Matrix E-4).

The net effect of removing the grade for student teaching for education majors was to lower the mean GPR for education majors and to make a rather noticeable difference between some majors. Both Elementary Education and Secondary Education became different from Microbiology; Elementary Education became different from English and Psychology; and Early Childhood Education no longer was different from Nursing.

Null Hypothesis 2-d stated that there would be no statistically significant differences in GPR-TOTAL for majors with the student teaching grade removed from education majors and with SAT-TOTAL used as a covariate. Analysis of covariance produced an F-value of 2.66 with one and nine degrees of freedom which was significant beyond the 0.01 level (See Appendix D for Source Table D-5). Therefore, Null Hypothesis 2-d was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology was significantly different from Electrical Engineering, Secondary Education, Elementary Education, and Nursing. English and Psychology were different from Secondary Education, Elementary Education, and Nursing. Microbiology, English, Psychology, Early Childhood Education, and Mechanical Engineering were not different from each other. English, Psychology, and Electrical Engineering were not different from each other. Mathematical Sciences, Early

Childhood Education, Mechanical Engineering, Secondary Education, Elementary Education, and Nursing were not different from each other (See Appendix E for Matrix E-5).

The net result of the analysis with the student teaching grade removed and the use of SAT-TOTAL as a covariate was to make Secondary Education different from English and Psychology as well as from Microbiology.

Null Hypothesis 3-a stated that there would be no statistically significant differences in GPR-CORE for majors. Analysis of variance produced an F-value of 4.58 with 9 and 236 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-6). Therefore, Null Hypothesis 3-a was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that English, Microbiology, Psychology, Electrical Engineering, and Secondary Education were significantly different from Elementary Education. In addition, English, Microbiology, and Psychology were different from Mechanical Engineering and Mathematical Sciences. Furthermore, English and Microbiology were different from Nursing and Early Childhood Education. English, Microbiology, Psychology, Electrical Engineering, and Secondary Education were not different from each other. Psychology, Electrical Engineering, Secondary Education, Nursing, and Early Childhood Education were not different from each other. Electrical Engineering, Secondary Education, Nursing, Early Childhood Education, Mechanical Engineering, and Mathematical Sciences were not different from each other. Nursing, Early Childhood Education, Mechanical Engineering, Mathematical Sciences, and Elementary

Education were not different from each other (See Appendix E for Matrix E-6).

Null Hypothesis 3-b stated that there would be no statistically significant differences in GPR-CORE for majors using SAT-TOTAL as a covariate. Analysis of covariance produced an F-value of 4.23 with one and nine degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-7). Therefore, Null Hypothsis 3-b was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that English, Microbiology, Psychology, and Electrical Engineering were significantly different from Elementary Education. In addition, English, Microbiology, and Psychology were different from Early Childhood Education, Mechanical Engineering, and Mathematical Sciences. Furthermore, English was different from Electrical Engineering, Secondary Education, and Nursing. English, Microbiology, and Psychology did not differ from each other. Microbiology, Psychology, Electrical Engineering, Secondary Education, and Nursing did not differ from each other. Electrical Engineering, Secondary Education, Nursing, Early Childhood Education, Mechanical Engineering, and Mathematical Sciences did not differ from each other. Secondary Education, Nursing, Early Childhood Education, Mechanical Engineering, Mathematical Sciences, and Elementary Education did not differ from each other.

The application of ANOCOVA had the net result of making Secondary Education different from English; Early Childhood Education different from Psychology; and Secondary Education and Elementary Education not different from each other.

Null Hypothesis 4-a stated that there would be no statistically significant differences in GPR-OTH REQ for majors. Analysis of variance produced an F-value of 3.38 with 9 and 246 degrees of freedom which was significant beyond the 0.001 level (See Appendix D for Source Table D-8). Therefore, Null Hypothesis 4-a was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology, English, Psychology, Mathematical Sciences and Electrical Engineering were significantly different from Nursing. In addition, Microbiology was different from Secondary Education and Elementary Education. Microbiology, English, Psychology, Mathematical Sciences, Electrical Engineering, Mechanical Engineering, and Early Childhood Education were not different from each other. English, Psychology, Mathematical Sciences, Electrical Engineering, Mechanical Engineering, Early Childhood Education, Secondary Education, Elementary Education were not different from each other. Mechanical Engineering, Early Childhood Education, Secondary Education, Elementary Education, and Nursing were not different from each other (See Appendix E for Matrix E-8).

Null Hypothesis 4-b stated that there would be no statistically significant differences in GPR-OTH REQ for majors with SAT-TOTAL used as a covariate. Analysis of covariance produced an F-value of 2.56 with one and nine degrees of freedom which was significant beyond the 0.01 level (See Appendix D for Source Table D-9). Therefore, Null Hypothesis 4-b was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology, Psychology, English, Electrical Engineering, and Mathematical Sciences were significantly different from Nursing. In addition, Microbiology, Psychology, English, and Electrical Engineering were different from Elementary Education. Furthermore, Microbiology, Psychology, and English were different from Secondary Education. Microbiology, Psychology, English, Electrical Engineering, Mathematical Sciences, Mechanical Engineering, and Early Childhood Education were not different from each other. Electrical Engineering, Mathematical Sciences, Mechanical Engineering, Early Childhood Education, and Secondary Education were not different from each other. Mathematical Sciences, Mechanical Engineering, Early Childhood Education, Secondary Education, and Elementary Education were not different from each other. Mechanical Engineering, Early Childhood Education, Secondary Education, Elementary Education and Nursing were not different from each other.

The net effect of using SAT-TOTAL as a covariate was that English and Psychology exchanged rank position and Electrical Engineering and Mathematical Sciences exchanged rank position. As for significant differences, Psychology and English became different from Secondary Education, and Electrical Engineering became different from Elementary Education. The result was to produce more differences between Education majors and other majors.

Null Hypothesis 5-a stated that there would be no statistically significant differences in GPR-ELEC for majors. Analysis of variance produced an F-value of 4.92 with 9 and 235 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-10). Therefore, Null Hypothesis 5-a was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology was significantly different from the other nine majors. In addition, Nursing, Mechanical Engineering, and Psychology had significantly higher means than Early Childhood Education and Elementary Education. In addition, Mathematical Sciences, English, and Electrical Engineering had significantly higher means than Elementary Education. Nursing, Mechanical Engineering, Psychology, Mathematical Sciences, English, Electrical Engineering, and Secondary Education were not different. Mathematical Sciences, English, Electrical Engineering, Secondary Education, and Early Childhood Education were not different from each other. Secondary Education, Early Childhood Education, and Elementary Education were not different from each other (See Appendix E for Matrix E-10).

Null Hypothesis 5-b stated that there would be no statistically significant differences in GPR-ELEC for majors using SAT-TOTAL as a covariate. Analysis of covariance produced an F-value of 3.37 with one and nine degrees of freedom which was significant beyond the 0.001 level (See Appendix D for Source Table D-11). Therefore, Null Hypothesis 5-b was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Microbiology was different from the other nine majors. In addition, Nursing, Mechanical Engineering, Psychology, Electrical

Engineering, Mathematical Sciences, and English had means which were significantly higher than Early Childhood Education and Elementary Education. Nursing, Mechanical Engineering, Psychology, Electrical Engineering, Mathematical Sciences, English, and Secondary Education were not different from each other. Secondary Education, Early Childhood Education, and Elementary Education were not different from each other (See Appendix E for Matrix E-11).

The net effect of using SAT-TOTAL as a covariate was that Electrical Engineering moved ahead of Mathematical Sciences and English in rank positions. As for significant differences, Electrical Engineering, Mathematical Sciences, and English had higher means than Early Childhood Education.

Null Hypothesis 6-a stated that there would be no statistically significant differences in GPR-PROG for majors. Analysis of variance produced an F-value of 9.31 with 9 and 246 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-12). Therefore, Null Hypothesis 6-a was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Secondary Education and Early Childhood Education had significantly higher means than Mathematical Sciences, Microbiology, Mechanical Engineering, Nursing, and Electrical Engineering. Furthermore, English and Elementary Education had significantly higher means than Mechanical Engineering, Nursing, and Electrical Engineering. In addition, Psychology, Mathematical Sciences, and Microbiology had significantly higher means than Electrical Engineering. Secondary

Education, Early Childhood Education, English, Elementary Education, and Psychology did not differ from each other. Psychology, Mathematical Sciences, Microbiology, Mechanical Engineering, and Nursing did not differ from each other. Mechanical Engineering, Nursing, and Electrical Engineering did not differ from each other (See Appendix E for Matrix E-12).

Null Hypothesis 6-b stated that there would be no statistically significant differences in GPR-PROG of majors using SAT-TOTAL as a covariate. Analysis of covariance produced an F-value of 11.20 with one and nine degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-13). Therefore, Null Hypothesis 6-b was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Early Childhood Education and Secondary Education had significantly higher means than Mathematical Sciences, Microbiology, Mechanical Engineering, Nursing, and Electrical Engineering. In addition, English, Elementary Education, and Psychology had significantly higher means than Mechanical Engineering, Nursing, and Electrical Engineering. Furthermore, Mathematical Sciences and Microbiology had significantly higher means than Electrical Engineering. In this analysis, only two changes occurred over the previous one using ANOVA. Early Childhood Education assumed the first rank position and Secondary Education moved to second rank position. Furthermore, Psychology was found to have a significantly higher mean than Mechanical Engineering and Nursing as well as Electrical Engineering (See Appendix E for Matrix E-13).

Null Hypothesis 6-c stated that there would be no statistically significant differences in GPR-PROG of majors with student teaching removed from the grades of education majors. Analysis of variance produced an F-value of 8.44 with 9 and 246 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-14). Therefore, Null Hypothesis 6-c was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Secondary Education had a significantly higher mean than Mathematical Sciences, Microbiology, Mechanical Engineering, Nursing, and Electrical Engineering. In addition, Early Childhood Education, English, and Elementary Education had significantly higher means than Mechanical Engineering, Nursing, and Electrical Engineering. Furthermore, Psychology, Mathematical Sciences, and Microbiology had significantly higher means than Electrical Engineering. Secondary Education, Early Childhood Education, English, Elementary Education, and Psychology did not differ from each other. Early Childhood Education, English, Elementary Education, Psychology, Mathematical Sciences, and Microbiology did not differ from each other. Psychology, Mathematical Sciences, Microbiology, Mechanical Engineering, and Nursing did not differ from each other. Mechanical Engineering, Nursing, and Electrical Engineering did not differ from each other (See Appendix E for Matrix E-14).

The net result of removing the student teaching grade from education majors' GPR was to lower the mean for Early Childhood Education to the degree that it was no longer significantly higher than Mathematical Sciences and Microbiology.

Null Hypothesis 6-d stated that there would be no statistically significant differences in GPR-PROG of majors with the student teaching grade removed from education majors' GPR and with SAT-TOTAL used as a covariate. Analysis of covariance produced an F-value of 10.26 with one and nine degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-15). Therefore, Null Hypothesis 6-d was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that removal of the student teaching grade from education majors' GPR's in the analysis of covariance did not change the rank positions of the ten majors from what they were in the previous analysis using analysis of variance (See 6-c above). However, the use of SAT-TOTAL as a covariate did show that Early Childhood Education had a higher mean than Mathematical Sciences and Microbiology in addition to Mechanical Engineering, Nursing, and Electrical Engineering. Actually, the rank positions and significant differences between majors in the analysis for Null Hypothesis 6-d were the same as those for Null Hypothesis 6-a (See Appendix E for Matrix E-15).

Null hypothesis 6-e stated that there would be no statistically significant differences in GPR-PROG of majors when only 300-400 level courses were used and when SAT-TOTAL was incorporated into the analysis as a covariate. Analysis of covariance produced an F-value of 10.70 with one and nine degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-16). Therefore, Null Hypothesis 6-e was rejected.

Duncan's Multiple Range Test comparing differences betwen majors revealed that Early Childhood Education and Secondary Education were significantly different from Microbiology, Mathematical Sciences, Mechanical Engineering, Nursing, and Electrical Engineering. In addition, English, Elementary Education, and Psychology were different from Mathematical Sciences, Mechanical Engineering, Nursing, and Electrical Engineering. Furthermore, Microbiology was different from Electrical Engineering.

This analysis, when compared to that testing differences for all program courses (See 6-a above), had the following result: Secondary Education and Early Childhood Education exchanged rank positions and Microbiology and Mathematical Sciences exchanged rank positions. Psychology was different from Mathematical Sciences, Mechanical Engineering, and Nursing in addition to Electrical Engineering; English and Elementary Education were different from Mathematical Sciences; and Mathematical Sciences was not different from Electrical Engineering. This analysis had the net effect of raising the means for English, Elementary Education, and Psychology and of lowering the mean for Mathematical Sciences (See Appendix E for Matrix E-16).

Null Hypothesis 6-f stated that there would be no statistically significant differences in GPR-PROG for 300-400 level courses in majors with the student teaching grade removed from the GPR of Education majors. Analysis of variance produced an F-value of 8.26 with 9 and 246 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-17). Therefore, Null Hypothesis 6-f was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Secondary Education was different from Microbiology, Mathematical Sciences, Nursing, Mechanical Engineering, and Electrical Engineering. In addition, Early Childhood Education and English were different from Mathematical Sciences, Nursing, Mechanical Engineering, and Electrical Engineering. Elementary Education and Psychology were different from Nursing, Mechanical Engineering, and Electrical Engineering. Furthermore, Microbiology was different from Electrical Engineering.

This analysis, when compared with the analysis of all program courses (see 6-a above), had the following effects: Microbiology exchanged rank position with Mathematical Sciences and Nursing exchanged rank position with Mechanical Engineering. Early Childhood Education was no longer different from Microbiology; English was now different from Mathematical Sciences; Psychology was different from Mechanical Engineering and Nursing; and Mathematical Sciences was no longer different from Electrical Engineering. The net result was to lower the means for Early Childhood Education and Mathematical Sciences and to raise the means for English and Psychology (See Appendix for Matrix E-17).

Null Hypothesis 6-g stated that there would be no statistically significant differences in GPR-PROG of majors for 300-400 level courses when SAT-TOTAL was used as a covariate and when the student teaching grade was removed from GPR of Education majors. Analysis of covariance produced an F-value of 9.66 with 1 and 9 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-18). Therefore, Null Hypothesis 6-g was rejected.

Duncan's Multiple Range Test comparing differences between majors revealed that Secondary Education and Early Childhood Education were different from Microbiology, Mathematical Sciences, Mechanical Engineering, Nursing, and Electrical Engineering. In addition, English, Psychology, and Elementary Education were different from Mathematical Sciences, Mechanical Engineering, Nursing, and Electrical Engineering. Furthermore, Microbiology was different from Electrical Engineering.

This analysis, when compared with the previous analysis (see 6-f above), showed the following changes: Early Childhood Education was different from Microbiology; Elementary Education and Psychology were different from Mathematical Sciences; Elementary Education and Psychology exchanged rank positions; and Mechanical Engineering and Nursing exchanged rank positions (See Appendix E for Matrix E-18).

Null Hypothesis 7 stated that there would be no statistically significant differences between GPR-PROG and a GPR computed for all non-program courses (GPR-NONPROG) within each major. The t-test procedure revealed that GPR-PROG was significantly higher than GPR-NONPROG for the following majors: Early Childhood Education, Elementary Education, English, Nursing, and Secondary Education. There were no significant differences between GPR-PROG and GPR-NONPROG for the following majors: Electrical Engineering, Microbiology, Mechanical Engineering, Mathematical Sciences, and Psychology. GPR-PROG was lower than GPR-NONPROG, although not significantly so, for Electrical Engineering and Microbiology (See Appendix F for t-test tables).

Null Hypothesis 8-a stated that there would be no statistically significant differences in GPR-TOTAL for the three residency groups. Analysis of variance produced an F-value of 1.29 with 2 and 253 degrees of freedom which was not significant at the 0.01 level (See Appendix D for Source Table D-19). Therefore, Null Hypothesis 8-a was not rejected.

Null Hypothesis 8-b stated that there would be no statistically significant differences in GPR-CORE for the three residency groups. Analysis of variance produced an F-value of 2.95 with 2 and 243 degrees of freedom which was not significant at the 0.01 level (See Appendix D for Source Table D-20). Therefore, Null Hypothesis 8-b was not rejected.

Null Hypothesis 8-c stated that there would be no statistically significant differences in GPR-OTH REQ for the three residency groups. Analysis of variance produced an F-value of 1.52 with 2 and 253 degrees of freedom which was not significant at the 0.01 level (See Appendix D for Source Table D-21). Therefore, Null Hypothesis 8-c was not rejected.

Null Hypothesis 8-d stated that there would be no statistically significant differences in GPR-ELEC for the three residency groups. Analysis of variance produced an F-value of 0.33 with 2 and 242 degrees of freedom which was not significant at the 0.01 level (See Appendix D for Source Table D-22). Therefore, Null Hypothesis 8-d was not rejected.

Null Hypothesis 8-e stated that there would be no statistically significant differences in GPR-PROG for the three residency groups. Analysis of variance produced an F-value of 1.09 with 2 and 253 degrees of freedom which was not significant at the 0.01 level (See Appendix D for Source Table D-23). Therefore, Null Hypothesis 8-e was not rejected.

Null Hypothesis 8-f stated that there would be no statistically significant differences in SAT-TOTAL for the three residency groups. Analysis of variance produced an F-value of 9.91 with 2 and 222 degrees of freedom which was significant at the 0.0001 level (See Appendix D for Source Table D-24). Therefore, Null Hypothesis 8-f was rejected.

Duncan's Multiple Range Test comparing differences between the residency groups revealed that all three differed from each other.

Two additional post hoc analyses were done to facilitate comparisons of majors and to produce more fine-grain results relative to total GPR and the four sub-categories. The first analysis involved a Relative Inflation-Deflation Index (RIDI) and the second involved a comparison of the number of times each major had means which were significantly higher, lower, or not different from the other majors on forty-five comparisons of GPR's.

A Relative Inflation-Deflation Index was computed by ranking the majors on a relevant predictor variable and then determining the difference between that rank and the ranks of the majors on a relevant criterion variable. The index is labeled "relative" because the amount of inflation is a function of the rank position of each major compared to the others on the predictor and criterion variables. The RIDI does not indicate "actual" inflation or deflation nor the magnitude of GPR means but is dependent upon variations in ranks between majors once a comparison point is established using a predictor variable. The RIDI answers the question, "Are GPR means of majors distributed in the way that the predictor variable would predict?"

The predictor variable in this study was SAT-TOTAL and five criterion variables were GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, and GPR-PROG. The formula used was:

RIDI= Rank of Predictor Variable - Rank of Criterion Variable

For example, the RIDI using SAT-TOTAL as the predictor variable would be:

RIDI= SAT-TOTAL Rank - GPR-TOTAL Rank

The rationale for such an index is simple: It would be expected that the rank on GPR-TOTAL would be the same or similar to that of SAT-TOTAL since there is a positive relationship between the two. (In this study, the coefficient produced when these two variables were correlated was 0.35, significant at the 0.0001 level.)

If the two ranks are the same, then the RIDI would be zero (RIDI= 3-3=0). If the SAT-TOTAL rank is lower than the GPR-TOTAL rank, the RIDI would be positive, indicating "inflation" in the GPR-TOTAL (RIDI= 6-1= +5). If, on the other hand, the SAT-TOTAL rank is higher than that of GPR-TOTAL, a negative RIDI would result, indicating "deflation" in grades (RIDI= 2-4= -2).

The Relative Inflation-Deflation Index gives only half the picture, however, because the index shows only the amount of incongruence between expected and achieved achievement; it does not indicate the significance of the inflation or deflation. A Significant Inflation Index (SIS) was established for each major by determining the number of rank positions on a GPR measure the major had to increase before it surpassed a major which was statistically significantly higher than it on SAT-TOTAL.

Conversely, a Significant Deflation Index (SDS) was established for each major by determining the number of rank positions on a GPR measure the major had to decrease before it fell below a major which was statistically significantly lower than it on SAT-TOTAL.

A major weakness of this approach for developing Significant Relative Inflation-Deflation Indices is that the majors that are ranked highest on SAT cannot show significant inflation and, conversely, the majors that are ranked lowest on SAT cannot show significant deflation. This type of problem results from comparisons made using ranks and might occur in any comparisons where there is a ceiling or floor effect to the ranking distributions. It must be remembered that this is a relative comparison of GPR ranks in conjunction with statistical differences in SAT ranks. As mentioned above, the significance of the RIDI is a function of the relative change in rank position of one major's GPR when compared to others which are significantly different when SAT's are compared; it gives no information about the magnitude of the GPR itself.

Significant Inflation-Deflation standards are given in Table G-1 of Appendix G. Relative Inflation-Deflation Indices for each major on all comparisons of GPR means are shown in Tables G2 - G11 of Appendix G. A summary of the RIDI's on GPR-TOTAL (analyzed by analysis of covariance) for each major is given below. Significant indices are marked with an asterisk.

When GPR-TOTAL was used as the criterion variable, the RIDI's for majors were:

Early Childhood Education	+6*
English	+4
Psychology	+2

Microbiology	+1
Elementary Education	0
Mathematical Sciences	-1
Nursing	-1
Secondary Education	-1
Mechanical Engineering	-3
Electrical Engineering	-6*

This ranking of majors reveals that Early Childhood Education had a significant amount of inflation and Electrical Engineering had a signficant amount of deflation.

When GPR-CORE was used as the criterion variable, the RIDI for majors were:

English	+5
Early Childhood Education	+3
Nursing	+2
Psychology	+2
Secondary Education	+2*
Microbiology	0
Elementary Education	-1
Electrical Engineering	-3
Mathematical Sciences	-5*
Mechanical Engineering	-5*

This ranking reveals that Secondary Education had a significant amount of inflation and Mathematical Sciences and Mechanical Engineering had significant amounts of deflation on core courses.

When GPR-OTH REQ was used as the criterion variable, the RIDI for majors were:

Early Childhood Education	+3
English	+3
Psychology	+3
Microbiology	+1
Elementary Education	0
Mathematical Sciences	-1
Secondary Education	-1
Nursing	-2
Mechanical Engineering	-3
Electrical Engineering	-3

No inflation or deflation was revealed by this ranking.

When GPR-ELEC was used as the criterion variable, the RIDI for majors were:

Nursing	+6*
Early Childhood Education	+1
Microbiology	+1
Psychology	+1
Mechanical Engineering	0
Elementary Education	-1
English	-1
Secondary Education	-1
Mathematical Sciences	-2
Electrical Engineering	-4

This ranking reveals that Nursing had a significant amount of inflation for elective courses.

When GPR-PROG was used as the criterion variable, in addition to the RIDI's for all program courses, RIDI's were computed for GPR-PROG without the student teaching grade included for Education majors and for 300-400 level program courses with and without the student teaching grade. All four types of RIDI's for the majors were:

	GPR-PROG	GPR-PROG without st. tchg.	300-400 level	300-400 level w/out st. tchg.
Early Childhood Education	+9*	+8*	+9*	+8*
Elementary Education	+5*	+5*	+5*	+4*
Secondary Education	+5*	+6*	+5*	+6*
English	+3	+3	+3	+3
Psychology	0	0	0	+1
Nursing	-1	-1	-1	-1
Mathematical Sciences	-2	-2	-3*	-3*
Mechanical Engineering	-5*	-5*	-5*	-5*
Microbiology	-5*	-5*	-4	-4
Electrical Engineering	-9*	-9*	-9*	-9*

This analysis reveals that Early Childhood, Elementary, and Secondary Education majors had significant amounts of inflation on GPR-PROG for all program courses and 300-400 level program courses, regardless of the inclusion or exclusion of the grade for student teaching. This latter variable causes some variation but not a significant amount.

On the other hand, Electrical Engineering, Mechanical Engineering, and Microbiology had significant amounts of deflation on all program courses although Microbiology showed no significant deflation for 300-400 level courses.

To summarize these analyses, it can be seen that:

(1) Early Childhood Education had significant inflation for GPR-TOTAL and for GPR-PROG;

(2) Secondary Education had significant inflation on GPR-CORE and for GPR-PROG;

(3) Nursing had significant inflation on GPR-ELEC;

(4) Elementary Education had significant inflation on GPR-PROG;

(5) Electrical Engineering had significant deflation on GPR-TOTAL and GPR-PROG;

(6) Mathematical Sciences had significant deflation on GPR-CORE and for GPR-PROG for 300-400 level courses;

(7) Mechancial Engineering had significant deflation on GPR-CORE and GPR-PROG;

(8) Microbiology had significant deflation on GPR-PROG, although not for GPR-PROG for 300-400 level program courses.

The final analysis was a simple count of the number of means each major had on GPR-TOTAL, GPR-CORE, GPR-OTHER REQUIRED, GPR-ELECTIVE, and GPR-PROGRAM which were significantly higher or lower or not different from each of the other majors when SAT-TOTAL was used as a covariate and Duncan's Multiple Range Test was employed. When each major was compared with the other nine majors on five variables, the result was forty-five comparisons. A summary of these comparisons is presented in Table H-1 with data for each major given in Tables H2-H11 of Appendix H. A breakdown of Table H-1 is given below. The first list shows the number of means for each major which were significantly higher when compared to the other nine majors. The percentage column in this and the two lists to follow represents the proportion of means to the total of forty-five comparisons.

Major	Number	%
Microbiology	22	49.0
English	17	37.8
Psychology	14	31.1
Early Childhood Education	6	13.3
Secondary Education	5	11.1
Electrical Engineering	5	11.1
Elementary Education	4	9.0
Mathematical Sciences	4	9.0
Mechanical Engineering	4	9.0
Nursing	2	4.4

The next list shows the number of means which were significantly lower than others.

Major	Number	%
Elementary Education	18	40.0
Nursing	16	35.6
Early Childhood Education	10	22.2
Electrical Engineering	10	22.2
Mechanical Engineering	8	17.7
Mathematical Sciences	6	13.3
Secondary Education	6	13.3
Microbiology	3	6.6
English	1	2.2
Psychology	1	2.2

The final list shows the number of means which were not different from others.

Major	Number	%
Mathematical Sciences	35	77.7
Secondary Education	34	75.6
Mechanical Engineering	33	73.3
Electrical Engineering	30	66.7
Psychology	30	66.7
Early Childhood Education	29	64.5
English	27	60.0
Nursing	27	60.0
Elementary Education	23	51.0
Microbiology	20	44.4

A summary of these results reveals that:

(1) Microbiology, English, and Psychology had the greatest number of means which were significantly higher than other majors.

(2) Elementary Education and Nursing had the greatest number of significantly lower means.

(3) Most comparisons revealed no signficant differences between majors. Although Elementary Education, English, Microbiology, and Nursing had the fewest number of means which were not significantly different, the reasons were quite different: Microbiology and English had a large proportion of significantly higher means while Elementary Education and Nursing had a large proportion of significantly lower means.

Discussion

It should be remembered that the results of this study must be interpreted within the limitations mentioned in the introduction. The sample of subjects consisted of 256 undergraduate students randomly selected from ten majors from five colleges who graduated from Clemson University in May 1982.

At the outset, the assumption was made that grade inflation did exist and that it was viewed as a problem at Clemson University as reflected in the decision in 1980 to raise standards for graduating with honors. The point was made that, although this decision reduced the number of honor graduates in subsequent years, it did not eliminate grade inflation. Evidence that the problem still exists is seen in action by the University Faculty Senate in November 1983 to recommend a "plus-minus" grading system, an action which some believe will result in a "regression toward the mean" effect.

Results from this study confirm the belief that grade inflation is still present. The mean GPR for all subjects in this study was 3.0482. This overall mean was higher than the minimum standard for graduating with honors before 1980. Only four of the ten majors investigated in this study had GPR means lower than the grand mean. Two of these were above 3.0 and a third was only two-tenths of a point below. Therefore, using the standards before 1980, the GPR grand mean for all students and the GPR means of eight of the ten majors were above the minimum standard for graduating with honors.

An analysis of individual transcripts revealed that 145 or 57% of the 256 students in this study had GPRs above 3.0. This percentage is higher than the approximately 45% of all students who graduated with honors in 1978 and 1979. The table below provides a comparison of the five colleges represented in this study by the average percentages of students graduating with honors in 1978 and 1979 and those who would have done so in the spring of 1982 had the standards not been changed.

College	Percent of Students with GPRs 3.0 or Higher	
	Springs of 1978 and 1979	Spring 1982
Education	55.5	55.0
Engineering	43.5	48.5
Liberal Arts	47.5	82.5
Nursing	30.5	38.0
Sciences	71.0	69.2

Inspection of these results reveals that, with the exception of Liberal Arts, the two sets of percentages are strikingly similar. Discrepancies may be a result of sample sizes inasmuch as the 1978-79 percentages are based upon all graduates in a college whereas the 1982 results are based on a sample of subjects within a selected set of majors.

An additional analysis which points out the current relevancy of the data used in this study comes from a comparison of the percentage of "A's" and "B's" assigned in one college. In the College of Education in fall semester 1977, 87.8% of all grades assigned were "A's" and "B's". In the Department of Elementary Education (which offers the majors in Early Childhood Education, Elementary Education, and Secondary Education) for fall semester 1982, 89.2% of the grades assigned were "A's" and "B's".

On the basis of these results it seems safe to say that grade inflation, if it existed in 1978 and 1979, is still present today.

The major thrust of this study was directed toward answering the questions, "Where does grade inflation reside?" and "Is grade inflation differentially distributed among the several majors included in this study?" The preceding analyses would seem to indicate that, generally speaking, grade inflation is present in all majors to a greater or lesser extent. One question must be answered, however, before the validity of this generalization is confirmed: "Are higher GPR's justified in some majors more so than in others given the level of initial ability as measured by SAT scores?"

One would expect that students of varying abilities would achieve at different levels if the curricula in each major were equally difficult. If this were the case, what might appear as grade inflation in a given major might only be the level of achievement one would expect; conversely, that same achievement in another major might indicate inflation or deflation. If students who are different in ability achieve at similar levels, the conclusion is that there must be other factors contributing to these differences, one of which could be the program majors.

It should be noted that the GPR means of most of the majors included in this study were similar. The question of whether or not this should be expected was addressed by comparing SAT means of the majors. Analysis of variance revealed that, in fact, there were significant differences in SAT means among the several majors (See Source Table D-1, Appendix D). Duncan's Multiple Range Test comparing each major with each of the others (Matrix E-1, Appendix E) indicated that majors fell into two rather distinct categories.

Group One included Electrical Engineering, Microbiology, Mechanical Engineering, Mathematical Sciences, Psychology, and English, all of which had SAT means above 1000. Group Two included Secondary Education, Nursing, Elementary Education, and Early Childhood Education, all of which had SAT means below 1000. All majors in Group One had SAT means which were statistically signficantly higher than all majors in Group Two, with the exception of English which was not different from Secondary Education and Nursing. Majors within each group were not different from each other. For all practical purposes, then, it could be said that all majors in Group One were alike in initial ability whereas all those in Group Two were alike. This is an important point for interpreting the descriptive statistic called the Relative Inflation-Deflation Index which is a function of the SAT and GPR rankings among majors.

The ten majors in this study were compared on total GPR and four sub-categories. Comparisons were also done for the total GPR and for the program sub-category including all program courses and 300-400 level programs with and without the student teaching grade for Education majors. Three types of analyses were performed in making these comparisons. Differences among majors were compared using both analysis of variance (ANOVA) and analysis of covariance (ANOCOVA). The former insured that all subjects were included while the latter was used to control for initial ability of students.

Since ANOVA and ANOCOVA indicate only that differences existed among majors but not where the differences were, a second approach, Duncan's Multiple Range Test, was employed to test for between-major differences.

Although this second approach revealed differences between majors, it could not show how much inflation existed within majors. Therefore, a third approach, the Relative Inflation-Deflation Index, was used. This index indicates whether or not the rank position for the GPR for a major is substantially higher or lower than could be expected from its rank on SAT when compared to other majors.

Of the twenty-two null hypothesis concerning GPR comparisons, seventeen were rejected, indicating that, among the ten majors, statistically signficant differences were present. Only those null hypotheses related to residency groups were not rejected. Students classified as Full Resident, Partial Resident, or Transfer did not differ from each other on total GPR or any of the four sub-categories. Therefore, the following discussion will address results obtained from comparisons using Duncan's Multiple Range Test and the Relative Inflation-Deflation Index.

One major finding was that few differences existed when majors were compared on total GPR. The total GPR mean for Microbiology was significantly higher than those for Elementary Education, Mechanical Engineering, Electrical Engineering, and Nursing. One would expect this difference where Elementary Education and Nursing were concerned but not for the two Engineering majors based on SAT results. English and Psychology had significantly higher means than Elementary Education and Nursing, which also was not surprising. An unexpected finding, however, was that Early Childhood Education had a higher total GPR mean than Nursing even though their SAT means were not significantly different.

When the student teaching grade was removed from the total GPR mean for Education majors, the net effect was to widen the gap between Secondary Education, English, and Psychology and to narrow the gap betweeen Elementary Education and Nursing. This means that the student teaching grade, which accounted for twelve credit hours, did increase the overall GPR means for Secondary Education and Elementary Education but only in comparison with the above-mentioned majors.

Although several of the majors had significantly different total GPR means, only two had "significant" Relative Inflation-Deflation Indices. Early Childhood Education had an RIDI of +6 which indicated that the total GPR mean was substantially higher than would be expected based on the ranking of SAT means. Electrical Engineering had an RIDI of -6 which indicated that the total GPR mean was substantially lower than would be expected.

More variation appeared in the analysis of the sub-category GPR for Core courses than for the total GPR means. English, Microbiology, and Psychology all had significantly higher means than Early Childhood Education, Mechanical Engineering, Mathematical Sciences, and Elementary Education. English also differed significantly from Electrical Engineering, Secondary Education, and Nursing. The differences relative to the Education majors and Nursing could be predicted but, again, the differences relative to the other majors were surprising. The Core courses were made up of English and humanities courses which might account for the higher GPR means for English and Psychology majors when compared to the more scientifically oriented courses such as Engineering and Mathematics although Microbiology does not fit this pattern.

Three majors had signficant RIDI's. Secondary Education had a +2, indicating substantial inflation and Mathematical Sciences and Mechanical Engineering had RIDI's of -5, indicating substantial deflation.

The comparison of majors on GPR for Other Required courses revealed the smallest amount of variation among the majors. The ranking of majors on this sub-category was almost identical to that of the ranking on total GPR, thus indicating that this category of courses might be more representative of overall academic achievement than any of the other three sub-categories. This is also evident in the fact that none of the majors had any significant inflation or deflation as revealed by the Relative Inflation-Deflation Index.

Several interesting results arose from comparisons made on GPR means for Elective courses. Microbiology had a GPR mean which was significantly higher than the other nine majors; Early Childhood Education produced its lowest GPR mean of all the sub-categories; Nursing produced its only significantly higher GPR mean in this category, being higher than Early Childhood and Elementary Education; and all three Education majors occupied the bottom three rank positions. Nursing had the only significant RIDI of +6 which indicated substantial inflation in this category.

The most incongruent results in this study derived from comparisons on Program course GPRs. Regardless of the combination of variables--program GPR, program GPR with student teaching grade removed for Education majors, or 300-400 level program GPR with and without the student teaching grade -- the three Education majors occupied three of the top four rank positions and had significantly higher GPR means than four majors which had significantly higher SAT means.

This finding that Education students achieve program grades that are generally different from those of students in most other majors confirms results of other studies. Schoenfeldt and Brush (1975) discovered that Education, Agriculture, and Home Economics grades defined a factor labeled Grades Independent of Achievement and Aptitude. Hoover and Schoerder (1976) reported that Education students, when compared to those in six other colleges, had the highest average GPR and next to the lowest average American College Testing score.

The differences between Education majors and others are not so great for Early Childhood and Elementary Education when the student teaching grade is removed from the GPR for all program courses. However, when only the 300-400 level program courses are considered, the differences increase and the removal of the student teaching grade makes no difference. This contradicts the argument that students in all majors receive similar grades in upper division program courses. These results indicate that, in comparison to Education majors, students in some majors do better in lower division program courses than they do in the upper division courses. This also means that the student teaching grade makes a greater contribution to Education students' GPR's for all courses than it does for the upper division courses. The argument has been made that, since most Education courses are at the 300-400 level, Education majors would compare more favorably to other majors if only 300-400 level courses were considered. These findings do not support this argument.

It is also on this variable that one encounters the largest number of significant RIDI's. Early Childhood Education had an RIDI of +9 and Elementary Education and Secondary Education had RIDI's of +5, all indicating substantial inflation. Mechanical Engineering, Microbiology, and Electrical Engineering had RIDI's of -5, -5, and -9, respectively, indicating substantial deflation.

One additional analysis which confirms this inflation in program GPR's for Education majors was a comparison of GPR's computed for program and non-program courses. A t-test analysis showed a statistically significant difference in favor of program courses for all three Education majors. English and Nursing also had significantly higher program GPR's when compared to non-program courses.

This latter finding may seem inconsistent since neither of these majors had significant RIDIs for program GPR's. It must be remembered, however, that the RIDI is based on discrepancies in rank positions between SAT and total GPR means and says nothing about the magnitude of the GPR means. Since English was ranked high on SAT, it was not possible to achieve an RIDI which indicated inflation. The t-test procedure compared the differences between two means rather than the differences in rank positions. Therefore, it is possible for the values of the GPR's for program and non-program courses to be significantly different.

Although Nursing had a relatively high GPR mean for Elective courses, this was probably off-set by the low GPR mean on Other Required courses. Since there were more courses in the latter category than in the former, the relative contribution of Other Required courses was greater than that of Elective courses.

A comparison of all majors across the four sub-categories of courses reveals that all students do better on program courses than on the other types. The GPR means for all subjects for each type of courses in rank order are: (1) Program -- 3.26, (2) Elective -- 3.06, (3) Other Required -- 2.95, and (4) Core--2.9.

A summary of the relative performances of the majors across these four categories of courses and the total GPR shows that Microbiology, English, and Psychology students did consistently well, as could be predicted from SAT mean scores, although, relatively speaking, Microbiology students did not do so well in program courses and English students did better in program courses than could be expected.

In an analysis of the number of times a major had GPR means which were statistically significantly higher, lower, or not different from other majors, English, Microbiology and Psychology accounted for the majority of the higher means in forty-five comparisons. They also had the fewest number of means which were significantly lower than others.

Mathematical Sciences, Electrical Engineering, and Mechanical Engineering students were less consistent in academic performance across all measures than were the three above-mentioned majors. These majors accounted for five of the six significant RIDI's which were negative, thus indicating that they performed much more poorly than expected on some GPR measures. Electrical Engineering students particularly performed poorly, relatively speaking, on program courses and had the only significant deflation index on total GPR.

The Nursing and Education majors accounted for all six significant RIDI's which indicated inflation. Nursing students tended to do better in Elective courses than one would expect. Education majors performed fairly consistently on all measures with the exception of program courses where they did considerably better than one would predict. Of the six significant RIDI's for program courses, Education majors had the three which indicated inflation, this regardless of the variables studied.

Before discussing some implications which can be derived from these results, it should be noted that two factors could possibly interact with student abilities and program majors to affect academic achievement. These are sex and residency status. In this study it was possible to address the latter but not the former.

Approximately 27% of the students in this study transferred to Clemson from some other institution of higher learning and 25% took at least one course at another institution prior to graduation. Only 48% of the graduates in this study entered as freshmen and took all their courses at Clemson. What effect might this have on academic achievement? Although the three residency groups differed significantly from each other in terms of SAT mean scores, they did not differ from each other when compared on total GPR means or on any of the four subcategories of courses (See Appendix B). It would seem, therefore, that across all students in the study, residency status is not related to academic achievement. It was not possible to compare students in each major by residency status because of small numbers.

It was not possible, either, to control for the sex factor because of the unequal distribution of males and females across majors. However, some interesting observations can be made. Those majors which could be classified as more "people-oriented" or more "humanistic" in emphasis--that is to say, students in Education, Nursing, and Liberal Arts--tended to have many more females than males. Of the 256 subjects in this study, the three colleges mentioned above had 143 females. This accounted for 55.9% of the subjects in the study and for 87% of the females. It should be noted that those majors which compiled the most grade inflation, especially in program courses, were in these three colleges.

Those majors which were in colleges dealing with more scientific subject matter --namely, Sciences and Engineering-- had predominantly male students. The seventy-six male students in this study from these two colleges accounted for 45.1% of the students in the study but for 81% of all males. All majors for which significant deflation was found were in these two colleges.

Based on this type of analysis, it seems that females in this study did much better in program courses dealing with people-oriented subject matter than males did in courses dealing with scientific subject matter even when initial ability to achieve academically was taken into account. Is this because of the intrinsic nature of the subject matter? Could it be differences in teaching methods? Are females graded more leniently than males? Are females more motivated to achieve in courses dealing with their careers? Do humanistically-oriented faculty have less strenuous standards? All of these speculations could be translated into testable hypotheses for future study.

Implications

There are a number of implications to be derived from this study.

First, it is apparent that grade inflation still exists at Clemson University and that it cannot be eliminated by methods such as raising standards for graduating with honors or by using unfounded arguments to to explain it away. Birnbaum's investigations (1977) revealed that grade average increases could not be explained by more able students being admitted to college, students learning more from their course work, or shifts in enrollments from programs with high standards to those with low standards. He concluded that grades have increased because similar students are getting higher grades in the same ccurses with the same level of achievement. He did, however, find a relationship between grade average increases and grading practices such as pass-fail and full-semester withdrawal privileges. Therefore, University-wide policies which Clemson has or is contemplating, such as restricting use of pass-fail, limiting withdrawal options, eliminating the "erasible F," and "plus-minus" grading scales, can influence overall GPR levels throughout the University.

An additional point should be made about University policy-making as it affects grade inflation, especially in relation to admissions standards. Goldman _et al_, (1974) discovered in a study comparing projected grade point averages in different majors that those fields with the lowest ability students tended to adopt the lowest grading standards for those students with low and middle abilities. Conversely, high grading standards were adopted by fields with high ability students. In the present study, it was found that those majors with the lowest SAT mean scores tended to have higher program GPR's than those majors with high GPR's. Goldman and his colleagues offered no explanation for this, but their findings, as well as those in this study, provide a fruitful field for investigation for those who are interested in the relationships between admission standards and grades.

A second implication derives from the first. The results of this study seem to highlight a point made by Birnbaum (1977) that a distinction must be made between inflation in grade point averages and inflation in grades themselves. He suggests that these are two separate problems with different causes and solutions. Grade point averages are mean ratings based on a number of courses consolidated for statistical purposes and subject to a wide range of institutional policies such as those mentioned earlier. Grade inflation in specific courses must be analyzed in terms of a number of different variables such as student abilities, faculty instructional philosophies, course content, teaching techniques, and grading standards, to mention a few. Furthermore, as Birnbaum stated, "...the mere awarding of higher grades does not necessarily imply grade inflation if the comparisons are between students of different ability levels, working at different performance levels, and taking different courses (p. 522)..." The results of this study seem to confirm this point.

Therefore, while grade inflation in total GPR's might be addressed at the university level, grade inflation in individual courses or programs call for more fine-grained, intensive investigations at the level of the departments and individual faculty. This would seem to be an important consideration for those departments whose majors had significant inflation mainly in program courses, for example, Education majors.

Third, while it might serve some purpose to make global comparisons across colleges using grade distributions or total grade point averages of students, it seems that more benefit would accrue from comparing majors within and across colleges using methods such as those employed in this study and those of Humphreys (1968) and Schoenfeldt and Brush (1975). The partitioning of the total GPR into sub-categories, using a variety of statistical analyses, and developing new descriptive indicators such as the Relative Inflation-Deflation Index should provide a body of empirical data for rational decision-making.

Fourth, replication of this study should be done incorporating more majors and a larger sample of subjects. Some majors have so few graduates each semester that a study covering several years would be necessary to investigate the variables addressed in this study. Future studies should also attempt to investigate the relationship between achievement and a variety of student variables, such as sex, motivation, and career interests, as well as context variables such as grading philosophies and policies within majors, teaching methods, and course content.

Finally, it is suggested that investigations into problems of grade inflation be addressed to all four types of questions described in the introduction. So often when a problem arises, a solution is suggested which only controls the problem rather than dealing with its causes. The identification of sources of grade inflation is only the first step. Determining causes and dealing with them is a much more complex task but one which is necessary. Hoover and Schroeder (1976) have explicated a number of reasons why the problems of grade inflation and differential grading practices are worthy of the time and effort of investigation, such as fairness, effects on student learning, relationships on shifting enrollments, and career opportunities for students. Decisions will and must be made for the resolution of these problems. These decisions should provide for more effective and equitable results to the degree that they are based upon empirical data.

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APPENDICES

APPENDIX A

PERCENTAGES AND RANKS OF GRADES GIVEN IN FALL 1977 AND HONOR GRADUATES IN SPRING 1978 AND SPRING 1979 FOR TEN COLLEGES AT CLEMSON UNIVERSITY

Appendix A

Percentages and Ranks of Grades Given in Fall 1977 and Honor Graduates in Spring 1978 and Spring 1979 for Ten Colleges at Clemson University

College	A and B Grades Assigned* Fall 1977		Honor Graduates** Spring 1978		Honor Graduates*** Spring 1979	
	%	Rank	%	Rank	%	Rank
Agriculture	75.5	2	45	3	43	6
Architecture	66.3	4	41	5	44	5
Education	87.8	1	56	2	54	2
Forestry	62.1	5	38	7	30	9
Engineering	54.1	7	41	5	46	4
Industrial Management and Textile Science	46.1	8	35	8	37	8
Liberal Arts	56.7	6	45	3	50	3
Nursing	68.4	3	23	9	38	7
Sciences	46.0	9	75	1	67	1

*Correlation between Grades and Honor Graduates 1978 = 0.00

**Correlation between Grades and Honor Graduates 1979 = -0.10

***Correlation between Honor Graduates 1978 and 1979 = 0.85

(Correlations computed using Spearman Rank Order Method)

APPENDIX B

NUMBER OF STUDENTS IN STUDY CLASSIFIED BY MAJOR, SEX, AND RESIDENCY STATUS

Appendix B

Number of Students in Study Classified by Major, Sex, and Residency Status

Major	N	Sex				Residency					
		Male	%	Female	%	Full	%	Partial	%	Transfer	%
Early Childhood Education	18	0	0.0	18	100.0	11	61.1	1	5.6	6	33.3
Electrical Engineering	30	27	90.0	3	10.0	18	60.0	3	10.0	9	30.0
Elementary Education	37	1	6.7	36	93.3	11	30.0	8	22.0	18	48.0
English	23	3	13.0	20	87.0	12	52.2	7	30.4	4	17.6
Microbiology	12	6	50.0	6	50.0	6	50.0	4	33.3	2	16.7
Mechanical Engineering	40	38	95.0	2	5.0	20	50.0	10	25.0	10	25.0
Mathematical Sciences	14	5	36.0	9	64.0	10	71.4	2	14.3	2	14.3
Nursing	39	2	5.0	37	95.0	16	41.0	15	38.5	8	20.5
Psychology	17	5	29.0	12	71.0	8	47.1	5	29.4	4	23.5
Secondary Education	26	6	23.0	20	77.0	9	34.6	9	34.6	8	30.8
Totals	256	93	36.3	163	63.7	121	47.27	64	25	71	27.73

APPENDIX C

SAMPLE COMPUTER RECORD FORMS FOR CLASSIFYING COURSES FOR EACH MAJOR

ABBREVIATIONS USED TO IDENTIFY MAJORS

ECED = Early Childhood Education

EENG = Electrical Engineering

ELEM = Elementary Education

ENGL = English

MTSC = Mathematical Sciences

MENG = Mechanical Engineering

MBIO = Microbiology

NURS = Nursing

PSYC = Psychology

SECD = Secondary Education*

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*All Secondary Education and Science Teaching majors were consolidated under Secondary Education. These majors included:

SEEC = Secondary Education: Economics
SEEN = Secondary Education: English
SEHS = Secondary Education: History
SEML = Secondary Education: Modern Languages
SEMS = Secondary Education: Mathematical Sciences
SENS = Secondary Education: Natural Sciences
SEPY = Secondary Education: Psychology
SESO = Secondary Education: Sociology
STBS = Science Teaching: Biological Sciences
STCH = Science Teaching: Chemistry
STES = Science Teaching: Earth Sciences
STMS = Science Teaching: Mathematical Sciences
STPS = Science Teaching: Physical Sciences

ID ECED ___ SATV ___ SATM ___ RANK IN CLASS ___

	Course	Hours	Grade
CORE:	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	MTSC 115	03	___
	MTSC 116	03	___
	MTSC 216	03	___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	MUSC 210	03	___
	ENGL ___	03	___
	___ (Science)	_	___
	___ (Science)	_	___
	___ (Science)	_	___
	___ (Science)	_	___
	CAAH 303/304	03	___
	ENGL 385	03	___
	INED 372	03	___

(Next Column)

	Course	Hours	Grade
	MUSC 400	03	___
	___ (Social Sci. Elective) ___		
	___ (Social Sci. Elective) ___		
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 334	03	___
	EDUC 461	03	___
	EDUC 466	03	___
	EDUC 471	03	___
	EDUC 483	03	___
	EDUC 488	03	___
	EDUC 321	03	___
	EDUC 336	03	___
	EDUC 458	03	___
	EDUC 462	03	___
	EDUC 484	12	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID EENG SATV ____ SATM ____ RANK IN CLASS ____

	Course	Hours	Grade		Course	Hours	Grade
CORE:	ENGL 101	03	___		ELCP 301	02	___
	ENGL 102	03	___		ELCP 302	03	___
	ENGL ___	03	___		ELCP 303	01	___
	______	03	___		ELCP 317	03	___
	______	03	___		ELCP 320	02	___
OTRQ:					ELCP 321	02	___
	ECON 200 or	03	___		ELCP 325	01	___
	ECON 211 or	03	___		ELCP 326	01	___
	ECON 212	03	___		ELCP 330	03	___
	MTSC 206	04	___		ELCP 340	02	___
	MTSC 208	04	___		ELCP 341	02	___
	CHEM 101	04	___		ELCP 410	03	___
	ENGR 180	03	___		ELCP 42_	03	___
	MTSC 106	04	___		ELCP 422	03	___
	MTSC 108	04	___		ELCP 411	01	___
	PHYS 122	03	___		ELCP 451	02	___
	PHYS 221	03	___		ELCP 402	01	___
	PHYS 222	03	___	ELEC:			
	PHYS 224	01	___		______	_	___
	______ (Sci.)	3-4	___		______	_	___
PROG:					______	_	___
	ELCP 201	03	___		______	_	___
	ELCP 202	03	___		______	_	___
	ELCP 203	01	___		______	_	___
	ELCP 250	03	___		______	_	___
					______	_	___

(Next Column)

ID ELEM_________ SATV____________ SATM________ RANK IN CLASS_____

	Course	Hours	Grade
CORE:	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	MTSC 115	03	___
	MTSC 116	03	___
	MTSC 216	03	___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	MUSC 210	03	___
	MUSC 400	03	___
	ENGL ___	03	___
	ENGL 385	03	___
	___ (Science)	04	___
	___ (Science)	04	___
	___ (Science)	04	___
	CAAH 303/304	03	___
	INED 372	03	___

(Next Column)

	Course	Hours	Grade
	___ ___ (Social Sci. elective)	03	___
	___ ___ (Social Sci. elective)	03	___
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 321	03	___
	EDUC 334	03	___
	EDUC 458	03	___
	EDUC 461	03	___
	EDUC 471	03	___
	EDUC 481	12	___
	EDUC 485	03	___
	EDUC 487	02	___
	EDUC 488	03	___
	EDUC 462	03	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID ENGL___ SATV___ SATM___ RANK IN CLASS___

CORE:	Course	Hours	Grade
	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	MTSC 101	03	___
	MTSC 102	03	___
	___ ___ (Foreign Lang.)	___	___
	___ ___ (Foreign Lang.)	___	___
	___ ___ (Foreign Lang.)	___	___
	___ ___ (Foreign Lang.)	___	___
	___ ___ (Nat. Sci.)	___	___
	___ ___ (Nat. Sci.)	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___

PROG:	Course	Hours	Grade
	ENGL 411	03	___
	ENGL ___	03	___
	ENGL ___	03	___
	ENGL ___	03	___
	ENGL ___	03	___
	ENGL ___	03	___
	ENGL ___	03	___
	ENGL ___	03	___
ELEC:			
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___

ID MTSC ________ SATV ________ SATM ________ RANK IN CLASS ________

	Course	Hours	Grade
CORE:	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	CPSC 110	03	___
	___ (Foreign Lang.)	04	___
	___ (Foreign Lang.)	04	___
	___ (Foreign Lang.)	03	___
	ECON 200	03	___
	ENGL ___	03	___
	___ (Natural Science)		___
	___ (Natural Science)		___
	CAAH 303 or MUSC 210	03	___
	___ (Social Sci.)	03	___
	___ (Social Sci.)	03	___
	___ (Humanities)	03	___
	___ (Math elective)		___
	___ (Math elective)		___

	Course	Hours	Grade
PROG:	MTSC 106	04	___
	MTSC 150	01	___
	MTSC 108	03	___
	MTSC 206	04	___
	MTSC 301	03	___
	MTSC 208	04	___
	MTSC 411	03	___
	MTSC 350	03	___
	MTSC 412 or MTSC 419	03	___
	MTSC 453 or MTSC 463	03	___
	MTSC 454 or MTSC 464	03	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID MENG ________ SATV ________ SATM ________ RANK IN CLASS ________

CORE:	Course	Hours	Grade	PROG:	Course	Hours	Grade
	ENGL 101	03	___		MENG 201	2	___
	ENGL 102	03	___		MENG 202	3	___
	ENGL ___	03	___		MENG 301	3	___
	___	03	___		MENG 302	3	___
	___	03	___		MENG 304	3	___
OTRQ:					MENG 311	3	___
	ENGR 180	03	___		MENG 312	3	___
	CHEM 101	04	___		MENG 313	3	___
	CHEM 102	04	___		MENG 401	3	___
	MTSC 106	04	___		MENG 402	3	___
	MTSC 108	04	___		MENG 405	3	___
	MTSC 206	04	___		MENG 412	3	___
	MTSC 208	04	___		MENG 413	1	___
	PHYS 122	03	___		MENG 414	1	___
	PHYS 222	03	___	ELEC:			
	CREN 310	03	___		___ ___	_	___
	ELCP 307	02	___		___ ___	_	___
	ELCP 308	02	___		___ ___	_	___
	ELCP 309	01	___		___ ___	_	___
	ELCP 310	01	___		___ ___	_	___
	EMEC 201	03	___		___ ___	_	___
	EMEC 202	03	___		___ ___	_	___
	EMEC 304	03	___		___ ___	_	___
	EMEC 305	01	___		___ ___	_	___
	EMEC 320	03	___		___ ___	_	___
	PHYS 221	03	___		___ ___	_	___

ID MBIO ________ SATV ________ SATM ________ RANK IN CLASS ________

	Course	Hours	Grade
CORE:	ENGL 101 ,	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	___ ___ (Soc. Sci.)	_	___
	___ ___ (Soc. Sci.)	_	___
OTRQ:			
	BIOL 110	05	___
	BIOL 111	05	___
	CHEM 101	04	___
	CHEM 112	04	___
	CHEM 223	03	___
	CHEM 227	01	___
	CHEM 224	03	___
	CHEM 228	01	___
	BICH 301	03	___
	ENGL 301	03	___
	ENGL ___	03	___
	GENE 305	03	___
	GENE 306	01	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

(Next Column)

	Course	Hours	Grade
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
PROG:			
	MBIO 100	01	___
	MBIO 305	04	___
	MBIO 401	04	___
	MBIO 412	04	___
	MBIO 411	04	___
	MBIO ___	___	___
	MBIO ___	___	___
	MBIO ___	___	___
	MBIO ___	___	___
	MBIO ___	___	___
	MBIO ___	___	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID NURS ________ SATV ________ SATM ________ RANK IN CLASS ____

CORE:	Course	Hours	Grade	PROG:	Course	Hours	Grade
	ENGL 101	03	___		NURS 100	01	___
	ENGL 102	03	___		NURS 207	03	___
	ENGL ___	03	___		NURS 209	01	___
	HIST ___	03	___		NURS 309	03	___
	PSYC 201	03	___		NURS 310	03	___
OTRQ:					NURS 311	05	___
	BIOL 103	03	___		NURS 312	05	___
	BIOL 105	01	___		NURS 313	03	___
	BIOL 104	03	___		NURS 314	03	___
	BIOL 106	01	___		NURS 413	04	___
	CHEM 101	04	___		NURS 414	04	___
	MTSC 101	03	___		NURS 419	03	___
	MTSC 102	03	___		NURS 421	03	___
	MTSC 203	03	___		NURS 422	03	___
	BICH 210	04	___	ELEC:			
	MICR 305	04	___		___ ___	_	___
	ZOOL 222	04	___		___ ___	_	___
	ZOOL 223	04	___		___ ___	_	___
	PSYC 340	03	___		___ ___	_	___
	SOCO 201	03	___		___ ___	_	___
	SOCO 202	03	___		___ ___	_	___
	NUTR 451	03	___		___ ___	_	___
	SOCO 311	03	___		___ ___	_	___
	PSYC 352	03	___		___ ___	_	___
	CHEM 102	04	___		___ ___	_	___
					___ ___	_	___
					___ ___	_	___

ID PSYC ______ SATV __________ SATM ________ RANK IN CLASS ______

CORE:	Course	Hours	Grade	PROG:	Course	Hours	Grade
	ENGL 101	03	___		PSYC 201	03	___
	ENGL 102	03	___		PSYC 210/263	03	___
	ENGL ___	03	___		PSYC 211/265	01	___
	HIST 172	03	___		PSYC 310/363	04	___
	HIST 173	03	___		PSYC ___	_	___
OTRQ:					PSYC ___	_	___
	MTSC 101	03	___		PSYC ___	_	___
	MTSC 102	03	___		PSYC ___	_	___
	___ ___ (Foreign Lang.)	_	___		PSYC ___	_	___
					PSYC ___	_	___
	___ ___ (Foreign Lang.)	_	___		PSYC ___	_	___
	___ ___ (Foreign Lang.)	_	___		PSYC ___	_	___
				ELEC:			
	___ ___ (Foreign Lang.)	_	___		___ ___	_	___
	___ ___ (Nat. Sci.)	_	___		___ ___	_	___
					___ ___	_	___
	___ ___ (Nat. Sci.)	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___
	___ ___	_	___		___ ___	_	___

ID SEEC SATV ____ SATM ____ RANK IN CLASS ____

	Course	Hours	Grade
CORE:			
	ENGL 101	03	____
	ENGL 102	03	____
	ENGL ___	03	____
	HIST 172	03	____
	HIST 173	03	____
OTRQ:			
	MTSC 101	03	____
	MTSC 102	03	____
	MTSC 203	03	____
	___ (Foreign Lang.)		____
	___ (Foreign Lang.)		____
	___ (Foreign Lang.)		____
	___ (Foreign Lang.)		____
	ECON 211	03	____
	ECON 212	03	____
	___ (Science)	_	____
	___ (Science)	_	____
	___ (Science)	_	____
	ACCT 200/201	03	____
	ENGL ___	03	____
	CAAH 303	03	____
	MUSC 210	03	____
	ECON 314	03	____

(Next Column)

	Course	Hours	Grade
	ECON 407	03	____
	ECON ___	03	____
	ECON ___	03	____
	ECON ___	03	____
	ECON ___	03	____
	ECON ___	03	____
	ECON ___	03	____
PROG:			
	EDUC 100	01	____
	EDUC 301	03	____
	EDUC 302	03	____
	EDUC 335	03	____
	EDUC 412	12	____
	EDUC 424	03	____
	EDUC 458	03	____
	EDUC 471	03	____
	EDUC 498	03	____
ELEC:			
	___ ___	_	____
	___ ___	_	____
	___ ___	_	____
	___ ___	_	____
	___ ___	_	____
	___ ___	_	____
	___ ___	_	____
	___ ___	_	____

ID SEEN ___ SATV ___ SATM ___ RANK IN CLASS ___

	Course	Hours	Grade		Course	Hours	Grade
CORE:							
	ENGL 101	03	___		ENGL 400	03	___
	ENGL 102	03	___		ENGL 401	03	___
	ENGL ___	03	___		ENGL 405/406	03	___
	HIST 172	03	___		ENGL 422/423	03	___
	HIST 173	03	___		ENGL 435	03	___
OTRQ:					ENGL 485	03	___
	MTSC 101	03	___	PROG:			
	MTSC 102	03	___		EDUC 100	01	___
	___ (Foreign Lang.)	___	___		EDUC 301	03	___
					EDUC 302	03	___
	___ (Foreign Lang.)	___	___		EDUC 335	03	___
					EDUC 412	12	___
	___ (Foreign Lang.)	___	___		EDUC 424	03	___
	___ (Foreign Lang.)	___	___		EDUC 458	03	___
	ENGL ___	03	___		EDUC 471	03	___
					EDUC 498	03	___
	___ (Science)	___	___				
				ELEC:			
	___ (Science)	___	___		___ ___	___	___
	___ (Science)	___	___		___ ___	___	___
	HIST 361	03	___		___ ___	___	___
	CAAH 303/304	03	___		___ ___	___	___
					___ ___	___	___
	___ (Social Sci. elective)	___	___		___ ___	___	___
	___ (Social Sci. elective)	___	___		___ ___	___	___
	ENGL 304	03	___		___ ___	___	___
	ENGL 386	03	___		___ ___	___	___
					___ ___	___	___

(Next Column)

ID SEHS______ SATV______ SATM______ RANK IN CLASS______

	Course	Hours	Grade
CORE:	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	MTSC 101	03	___
	MTSC 102	03	___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	HIST 101	03	___
	HIST 102	03	___
	___ (Science)	_	___
	___ (Science)	_	___
	___ (Science)	_	___
	ENGL ___	03	___
	___ (Social Science Elec.)		
	___ (Social Science Elec.)		
	CAAH 303/304	03	___
	MUSC 210	03	___

	Course	Hours	Grade
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 335	03	___
	EDUC 412	12	___
	EDUC 424	03	___
	EDUC 458	03	___
	EDUC 471	03	___
	EDUC 498	03	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID SEML SATV ___ SATM ___ RANK IN CLASS ___

	Course	Hours	Grade
CORE:			
	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	MTSC 101	03	___
	MTSC 102	03	___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Foreign Lang.)		___
	___ (Science)	___	___
	___ (Science)	___	___
	ENGL ___	03	___
	___ (Soc. Sci. Elec.)		___
	___ (Soc. Sci. Elec.)		___
	CAAH 303/304	03	___
	MUSC 210	03	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___

(Next Column)

	Course	Hours	Grade
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
PROG:			
	EDUC 100	03	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 335	03	___
	EDUC 412	12	___
	EDUC 424	03	___
	EDUC 458	03	___
	EDUC 471	03	___
	EDUC 498	03	___
ELEC:			
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___

ID SEMS___________ SATV___________ SATM___________ RANK IN CLASS___________

CORE:	Course	Hours	Grade
	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	BIOL 103	03	___
	BIOL 105	01	___
	BIOL 104	03	___
	BIOL 106	01	___
	MTSC 106	04	___
	MTSC 108	04	___
	MTSC 206	04	___
	CPSC 110	03	___
	___(Foreign Lang.)		___
	___(Foreign Lang.)		___
	___(Foreign Lang.)		___
	___(Foreign Lang.)		___
	ENGL ___	03	___
	___(Science elective)		___
	___(Science elective)		___
	CAAH 303/304	03	___
	MUSC 210	03	___
	(Next Column)		

	Course	Hours	Grade
	___(Social Science elective)		
	___(Social Science elective)		
	MTSC 301	03	___
	MTSC 308	03	___
	MTSC 350	03	___
	MTSC 408	03	___
	MTSC 411	03	___
	MTSC 412	03	___
	MTSC 453	03	___
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 335	03	___
	EDUC 412	12	___
	EDUC 424	03	___
	EDUC 458	03	___
	EDUC 471	03	___
	EDUC 498	03	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID SENS__________ SATV__________ SATM__________ RANK IN CLASS______

CORE:	Course	Hours	Grade		Course	Hours	Grade
	ENGL 101	03	___		CAAH 303/304	03	___
	ENGL 102	03	___		MUSC 210	03	___
	ENGL ___	03	___		GEOL 101	04	___
	HIST 172	03	___		GEOL 102	04	___
	HIST 173	03	___		PHYS 207	04	___
OTRQ:					PHYS 208	04	___
	BIOL 103	03	___		ASTR 102	03	___
	BIOL 105	01	___	PROG:			
	BIOL 104	03	___		EDUC 100	01	___
	BIOL 106	01	___		EDUC 301	03	___
	MTSC 101	03	___		EDUC 302	03	___
	MTSC 102	03	___		EDUC 335	03	___
	MTSC 203	03	___		EDUC 412	12	___
	CHEM 101	04	___		EDUC 424	03	___
	CHEM 102/112	04	___		EDUC 458	03	___
	___ (Foreign Lang.)		___		EDUC 471	03	___
					EDUC 498	03	___
	___ (Foreign Lang.)		___	ELEC:			
	___ (Foreign Lang.)		___		___ ___	_	___
					___ ___	_	___
	___ (Foreign Lang.)		___		___ ___	_	___
	ENGL ___	03	___		___ ___	_	___
	___ (Social Sci. elective)				___ ___	_	___
					___ ___	_	___
	___ (Social Sci. elective)				___ ___	_	___
	___ (Science elective)		___		___ ___	_	___
					___ ___	_	___

ID SEPY ____ SATV ____ SATM ____ RANK IN CLASS ____

CORE:	Course	Hours	Grade
	ENGL 101	03	___
	ENGL 102	03	___
	HIST 172	03	___
	HIST 173	03	___
	ENGL ___	03	___
OTRQ:			
	MTSC 101	03	___
	MTSC 102	03	___
	MTSC 203	03	___
	___ ___ (Foreign Lang.)		___
	___ ___ (Foreign Lang.)		___
	___ ___ (Foreign Lang.		___
	___ ___ (Foreign Lang.)		___
	___ ___ (Science)	___	___
	___ ___ (Science)	___	___
	___ ___ (Science)	___	___
	PSYC 201	03	___
	PSYC 210	03	___
	ENGL ___	03	___
	CAAH 303/304	03	___
	MUSC 210	03	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___

(Next Column)

	Course	Hours	Grade
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 335	03	___
	EDUC 412	12	___
	EDUC 424	03	___
	EDUC 458	03	___
	EDUC 471	03	___
	EDUC 498	03	___
ELEC:			
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___
	___ ___	___	___

ID___SESO__________SATV________SATM________RANK IN CLASS________

CORE:	Course	Hours	Grade
	ENGL 101	03	____
	ENGL 102	03	____
	ENGL ____	03	____
	HIST 172	03	____
	HIST 173	03	____
OTRQ:	MTSC 101	03	____
	MTSC 102	03	____
	MTSC 203	03	____
	____ ____ (Foreign Lang.)	__	____
	____ ____ (Foreign Lang.)	__	____
	____ ____ (Foreign Lang.)	__	____
	____ ____ (Foreign Lang.)	__	____
	ENGL ____	03	____
	SOCI 201	03	____
	SOCI 202	03	____
	____ ____ (Science)	__	____
	____ ____ (Science)	__	____
	____ ____ (Science)	__	____
	CAAH 303/304	03	____
	MUSC 210	03	____
	____ ____ (Social Sci. elec.)	__	____
	____ ____ (Social Sci. Elec.)	__	____

	Course	Hours	Grade
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
PROG:			
	EDUC 100	01	____
	EDUC 301	03	____
	EDUC 302	03	____
	EDUC 335	03	____
	EDUC 412	12	____
	EDUC 424	03	____
	EDUC 458	03	____
	EDUC 471	03	____
	EDUC 498	03	____
ELEC:			
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____

ID STBS ______ SATV ______ SATM ______ RANK IN CLASS ______

	Course	Hours	Grade		Course	Hours	Grade
CORE:	ENGL 101	03	___		EDUC 100	01	___
	ENGL 102	03	___		EDUC 301	03	___
	ENGL ___	03	___		EDUC 302	03	___
	HIST 172	03	___		EDUC 335	03	___
	HIST 173	03	___		EDUC 412	12	___
OTRQ:					EDUC 424	03	___
	CHEM 101	04	___		EDUC 458	03	___
	CHEM 112	04	___		EDUC 471	03	___
	BIOL 110	05	___		EDUC 498	03	___
	BIOL 111	05	___	ELEC:			
	MTSC 106	04	___		___ ___	_	___
	MTSC 301	03	___		___ ___	_	___
	ENGL ___	03	___		___ ___	_	___
	___ (Chemistry elective)	___			___ ___	_	___
					___ ___	_	___
	___ (Social Sci. elective)	___			___ ___	_	___
	___ (Social Sci. elective)	___			___ ___	_	___
	CAAH 303/304	03	___		___ ___	_	___
	MUSC 210	03	___		___ ___	_	___
	GENT 302	04	___		___ ___	_	___
	MICR 305	04	___		___ ___	_	___
	PHYS 207	04	___		___ ___	_	___
	PHYS 208	04	___		___ ___	_	___
	ZOOL 202	04	___		___ ___	_	___
	BIOC 210	04	___		___ ___	_	___
	BOTN 421				___ ___	_	___
	or ZOOL 223	04	___		___ ___	_	___

ID STCH________SATV_________SATM________RANK IN CLASS___________

CORE:	Course	Hours	Grade		Course	Hours	Grade
	ENGL 101	03	___		CHEM 332	03	___
	ENGL 102	03	___		CHEM 340	01	___
	ENGL ___	03	___		CHEM 402	03	___
	HIST 172	03	___		PHYS 207	04	___
	HIST 173	03	___		PHYS 208	04	___
OTRQ:				PROG:			
	BIOL 103	03	___		EDUC 100	01	___
	BIOL 105	01	___		EDUC 301	03	___
	BIOL 104	03	___		EDUC 302	03	___
	BIOL 106	01	___		EDUC 335	03	___
	CHEM 101	04	___		EDUC 412	12	___
	CHEM 112	04	___		EDUC 424	03	___
	MTSC 106	04	___		EDUC 458	03	___
	MTSC 108	04	___		EDUC 471	03	___
	MTSC 206	04	___		EDUC 498	03	___
	ENGL ___	03	___	ELEC:			
	___ ___ ___ ___ (Social Sci. elective)				___ ___	_	___
					___ ___	_	___
	___ ___ ___ ___ (Social Sci. elective)				___ ___	_	___
	CAAH 303/304	03	___		___ ___	_	___
	MUSC 210	03	___		___ ___	_	___
	CHEM 223	03	___		___ ___	_	___
	CHEM 227	01	___		___ ___	_	___
	CHEM 224	03	___		___ ___	_	___
	CHEM 313	03	___		___ ___	_	___
	CHEM 339	01	___		___ ___	_	___

ID STES SATV________ SATM________ RANK IN CLASS________

	Course	Hours	Grade
CORE:	ENGL 101	03	____
	ENGL 102	03	____
	ENGL ____	03	____
	HIST 172	03	____
	HIST 173	03	____
OTRQ:			
	BIOL 103	03	____
	BIOL 105	01	____
	BIOL 104	03	____
	BIOL 106	01	____
	CHEM 101	04	____
	CHEM 102	04	____
	MTSC 101	03	____
	MTSC 102	03	____
	MTSC 203	03	____
	ENGL ____	03	____
	____ (Science elective)		____
	____ (Science elective)		____
	____ (Social Sci. elective)		____
	CAAH 303/304	03	____
	MUSC 210	03	____
	GEOL 101	04	____
	GEOL 102	04	____
	GEOL 306	03	____
	GEOL 405	04	____

(Next column)

	Course	Hours	Grade
	PHYS 207	04	____
	PHYS 208	04	____
	PHYS 240	03	____
	ASTR 301	03	____
PROG:			
	EDUC 100	01	____
	EDUC 301	03	____
	EDUC 302	03	____
	EDUC 335	03	____
	EDUC 412	12	____
	EDUC 424	03	____
	EDUC 458	03	____
	EDUC 471	03	____
	EDUC 498	03	____
ELEC:			
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____
	____ ____	__	____

ID STMS ____________ SATV __________ SATM ________ RANK IN CLASS ______

CORE:	Course	Hours	Grade
	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	BIOL 103	03	___
	BIOL 105	01	___
	BIOL 104	03	___
	BIOL 106	01	___
	CHEM 101	04	___
	CHEM 102/112	04	___
	MTSC 106	04	___
	MTSC 108	04	___
	MTSC 206	04	___
	ENGL ___	03	___
	___ (Math elective) ___		___
	___ (Social Sci. elective)		___
	___ (Social Sci. elective)		___
	CAAH 303/304	03	___
	MUSC 210	03	___
	CPSC 110	03	___
	PHYS 207	04	___
	PHYS 208	04	___
	MTSC 301	03	___

(Next Column)

	Course	Hours	Grade
	MTSC 308	03	___
	MTSC 408	03	___
	MTSC 411	03	___
	MTSC 350	03	___
	MTSC 412	03	___
	MTSC 453	03	___
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 335	03	___
	EDUC 412	12	___
	EDUC 424	03	___
	EDUC 458	03	___
	EDUC 471	03	___
	EDUC 498	03	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

ID __STPS____ SATV ________ SATM ________ RANK IN CLASS ____________

	Course	Hours	Grade
CORE:	ENGL 101	03	___
	ENGL 102	03	___
	ENGL ___	03	___
	HIST 172	03	___
	HIST 173	03	___
OTRQ:			
	BIOL 103	03	___
	BIOL 105	01	___
	BIOL 104	03	___
	BIOL 106	01	___
	CHEM 101	04	___
	CHEM 102	04	___
	MTSC 105	05	___
	MTSC 106	05	___
	___ (Science elective)		___
	___ (Science elective)		___
	ENGL ___	03	___
	___ (Social Sci. elective)		___
	___ (Social Sci. elective)		___
	CAAH 303/304	03	___
	MUSC 210	03	___
	PHYS 207	04	___
	PHYS 208	04	___
	PHYS 460	03	___
	CHEM 201	04	___

(Next column)

	Course	Hours	Grade
	ASTR 101	03	___
	ASTR 102	03	___
	GEOL 101	03	___
	GEOL 102	03	___
PROG:			
	EDUC 100	01	___
	EDUC 301	03	___
	EDUC 302	03	___
	EDUC 335	03	___
	EDUC 412	12	___
	EDUC 424	03	___
	EDUC 458	03	___
	EDUC 471	03	___
	EDUC 498	03	___
ELEC:			
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___
	___ ___	_	___

APPENDIX D

SOURCE TABLES

SOURCE TABLE D-1

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON SAT-TOTAL

Source	DF	Mean Square	F Value	PR>F
Model	9	198462.9542	11.33	0.0001
Error	215	17509.5715		
Total	224			

SOURCE TABLE D-2

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-TOTAL

Source	DF	Mean Square	F Value	PR>F
Model	9	0.48889087	2.66	0.0059
Error	246	0.18369091		
Total	255			

SOURCE TABLE D-3

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-TOTAL WITH SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	0.920592047	6.15	0.0001
SAT-TOT	1	0.506797094	33.85	0.0001
Major	9	0.413794953	3.07	0.0018
Error	214	0.14972921		
Total	224			

SOURCE TABLE D-4

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-TOTAL WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR

Source	DF	Mean Square	F Value	PR>F
Model	9	0.50887234	2.64	0.0063
Error	246	0.19275483		
Total	255			

SOURCE TABLE D-5

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-TOTAL WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR AND WITH SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	1.02724276	6.60	0.0001
SAT-TOT	1	0.653915856	41.99	0.0001
Major	9	0.373326907	2.66	0.0061
Error	214	0.15573875		
Total	224			

SOURCE TABLE D-6

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-CORE

Source	DF	Mean Square	F Value	PR>F
Model	9	1.56122296	4.58	0.0001
Error	236	0.34079985		
Total	245			

SOURCE TABLE D-7

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-CORE WITH SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	2.25602924	8.17	0.0001
SAT-TOT	1	1.204385422	43.61	0.0001
Major	9	1.051643817	4.23	0.0001
Error	211	0.27617702		
Total	221			

SOURCE TABLE D-8

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-OTH REQ

Source	DF	Mean Square	F Value	PR>F
Model	9	0.89285784	3.38	0.0007
Error	246	0.26422885		
Total	255			

SOURCE TABLE D-9

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-OTH REQ WITH SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	1.61828787	7.64	0.0001
SAT-TOT	1	1.129337504	53.31	0.0001
Major	9	0.488950365	2.56	0.0081
Error	214	0.21183536		
Total	224			

SOURCE TABLE D-10

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-ELEC

Source	DF	Mean Square	F Value	PR>F
Model	9	1.64788935	4.92	0.0001
Error	235	0.33481857		
Total	244			

SOURCE TABLE D-11

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-ELEC USING SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	2.10525160	7.25	0.0001
SAT-TOT	1	1.224726916	42.19	0.0001
Major	9	0.880524687	3.37	0.0008
Error	206	0.29027502		
Total	216			

SOURCE TABLE D-12

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-PROG

Source	DF	Mean Square	F Value	PR>F
Model	9	1.70482755	9.31	0.0001
Error	246	0.18308319		
Total	255			

SOURCE TABLE D-13

ANALYSIS OF COVARIANCE COMPARING
TEN MAJORS ON GPR-PROG
USING SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	1.60336551	10.17	0.0001
SAT-TOT	1	0.013776038	0.87	0.3509
Major	9	1.589589474	11.20	0.0001
Error	214	0.15764728		
Total	224			

SOURCE TABLE D-14

ANALYSIS OF VARIANCE COMPARING
TEN MAJORS ON GPR-PROG
WITH STUDENT TEACHING GRADE REMOVED
FROM EDUCATION MAJORS' GPR

Source	DF	Mean Square	F Value	PR>F
Model	9	1.55334672	8.44	0.0001
Error	246	0.18400126		
Total	255			

SOURCE TABLE D-15

ANALYSIS OF COVARIANCE COMPARING
TEN MAJORS ON GPR-PROG
WITH STUDENT TEACHING GRADE REMOVED
FROM EDUCATION MAJORS' GPR
AND USING SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	1.49627718	9.52	0.0001
SAT-TOT	1	0.045047868	2.87	0.0919
Major	9	1.451229308	10.26	0.0001
Error	214	0.15712626		
Total	224			

SOURCE TABLE D-16

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-PROG COMPUTED ON 300-400 LEVEL MAJOR COURSES USING SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	1.63383824	9.65	0.0001
SAT-TOT	1	0.003738627	0.22	0.6389
Major	9	1.630099612	10.70	0.0001
Error	214	0.16934392		
Total	224			

SOURCE TABLE D-17

ANALYSIS OF VARIANCE COMPARING TEN MAJORS ON GPR-PROG COMPUTED FOR 300-400 LEVEL MAJOR COURSES WITH STUDENT TEACHING REMOVED FROM EDUCATION MAJORS' GPR

Source	DF	Mean Square	F Value	PR>F
Model	9	1.59968146	8.26	0.0001
Error	246	0.19372329		
Total	255			

SOURCE TABLE D-18

ANALYSIS OF COVARIANCE COMPARING TEN MAJORS ON GPR-PROG COMPUTED ON 300-400 LEVEL MAJOR COURSES WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR AND USING SAT-TOTAL AS A COVARIATE

Source	DF	Mean Square	F Value	PR>F
Model	10	1.50034361	8.85	0.0001
SAT-TOT	1	0.026102974	1.54	0.2160
Major	9	1.474240637	9.66	0.0001
Error	214	0.16953644		
Total	224			

SOURCE TABLE D-19

ANALYSIS OF VARIANCE COMPARING THREE RESIDENCY GROUPS ON GPR-TOTAL

Source	DF	Mean Square	F Value	PR>F
Model	2	0.24955914	1.29	0.2781
Error	253	0.19402712		
Total	255			

SOURCE TABLE D-20

ANALYSIS OF VARIANCE COMPARING THREE RESIDENCY GROUPS ON GPR-CORE

Source	DF	Mean Square	F Value	PR>F
Model	2	1.12035324	2.95	0.0541
Error	243	0.37958463		
Total	245			

SOURCE TABLE D-21

ANALYSIS OF VARIANCE COMPARING THREE RESIDENCY GROUPS ON GPR-OTH REQ

Source	DF	Mean Square	F Value	PR>F
Model	2	0.43389182	1.52	0.2205
Error	253	0.28524994		
Total	255			

SOURCE TABLE D-22

ANALYSIS OF VARIANCE COMPARING THREE RESIDENCY GROUPS ON GPR-ELEC

Source	DF	Mean Square	F Value	PR>F
Model	2	0.12603462	0.33	0.7214
Error	242	0.38537727		
Total	244			

SOURCE TABLE D-23

ANALYSIS OF VARIANCE COMPARING THREE RESIDENCY GROUPS ON GPR-PROG

Source	DF	Mean Square	F Value	PR>F
Model	2	0.25805273	1.09	0.3376
Error	253	0.23662374		
Total	255			

SOURCE TABLE D-24

ANALYSIS OF VARIANCE COMPARING THREE RESIDENCY GROUPS ON SAT-TOTAL

Source	DF	Mean Square	F Value	PR>F
Model	2	227389.49889348	9.91	0.0001
Error	222	22954.70953950		
Total	224			

APPENDIX E

MATRICES FOR
DUNCAN'S MULTIPLE RANGE TESTS

MATRIX E-1

DUNCAN'S MULTIPLE RANGE TEST COMPARING SAT-TOTAL FOR TEN MAJORS

N = 224 $\bar{X}$ = 1007.8	Electrical Engineering	Microbiology	Mechanical Engineering	Mathematical Sciences	Psychology	English	Secondary Education	Nursing	Elementary Education	Early Childhood Education
Electrical Engineering N = 25 $\bar{X}$ = 1111.0		0	0	0	0	0	X	X	X	X
Microbiology N = 11 $\bar{X}$ = 1108.2	0		0	0	0	0	X	X	X	X
Mechanical Engineering N = 34 $\bar{X}$ = 1106.8	0	0		0	0	0	X	X	X	X
Mathematical Sciences N = 14 $\bar{X}$ = 1092.0	0	0	0		0	0	X	X	X	X
Psychology N = 16 $\bar{X}$ = 1049.4	0	0	0	0		0	X	X	X	X
English N = 21 $\bar{X}$ = 1020.0	0	0	0	0	0		0	0	X	X
Secondary Education N = 23 $\bar{X}$ = 954.8	X	X	X	X	X	0		0	0	0
Nursing N = 35 $\bar{X}$ = 950.7	X	X	X	X	X	0	0		0	0
Elementary Education N = 31 $\bar{X}$ = 881.0	X	X	X	X	X	X	0	0		0
Early Childhood Education N = 15 $\bar{X}$ = 874.0	X	X	X	X	X	X	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-2

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-TOTAL FOR TEN MAJORS

N = 255 X̄ = 3.0482	Microbiology	English	Psychology	Early Childhood Education	Mathematical Sciences	Secondary Education	Elementary Education	Mechanical Engineering	Electrical Engineering	Nursing
Microbiology N = 12 X̄ = 3.3157		0	0	0	0	0	X	X	X	X
English N = 23 X̄ = 3.2560	0		0	0	0	0	0	0	0	X
Psychology N = 17 X̄ = 3.2073	0	0		0	0	0	0	0	0	X
Early Childhood Education N = 18 X̄ = 3.1492	0	0	0		0	0	0	0	0	X
Mathematical Sciences N = 14 X̄ = 3.1133	0	0	0	0		0	0	0	0	0
Secondary Education N = 26 X̄ = 3.0520	0	0	0	0	0		0	0	0	0
Elementary Education N = 37 X̄ = 3.0088	X	0	0	0	0	0		0	0	0
Mechanical Engineering N = 40 X̄ = 3.0062	X	0	0	0	0	0	0		0	0
Electrical Engineering N = 30 X̄ = 2.9574	X	0	0	0	0	0	0	0		0
Nursing N = 39 X̄ = 2.8521	X	X	X	X	0	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-3

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-TOTAL FOR TEN MAJORS USING SAT-TOTAL AS A COVARIATE

N = 224 $\bar{X}$ = 3.0588	Microbiology	English	Psychology	Early Childhood Education	Mathematical Sciences	Mechanical Engineering	Electrical Engineering	Secondary Education	Elementary Education	Nursing
Microbiology N = 11 $\bar{X}$ = 3.3103		0	0	0	0	X	X	X	X	X
English N = 21 $\bar{X}$ = 3.2738	0		0	0	0	0	0	0	X	X
Psychology N = 16 $\bar{X}$ = 3.2617	0	0		0	0	0	0	0	X	X
Early Childhood Education N = 15 $\bar{X}$ = 3.1587	0	0	0		0	0	0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.1133	0	0	0	0		0	0	0	0	0
Mechanical Engineering N = 34 $\bar{X}$ = 3.0282	X	0	0	0	0		0	0	0	0
Electrical Engineering N = 25 $\bar{X}$ = 3.0188	X	0	0	0	0	0		0	0	0
Secondary Education N = 23 $\bar{X}$ = 3.0106	X	0	0	0	0	0	0		0	0
Elementary Education N = 31 $\bar{X}$ = 2.9589	X	X	X	0	0	0	0	0		0
Nursing N = 35 $\bar{X}$ = 2.8721	X	X	X	X	0	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-4

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-TOTAL FOR TEN MAJORS WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR

N = 255 $\bar{X}$ = 3.0289	Microbiology	English	Psychology	Mathematical Sciences	Early Childhood Education	Mechanical Engineering	Secondary Education	Electrical Engineering	Elementary Education	Nursing
Microbiology N = 12 $\bar{X}$ = 3.3157		0	0	0	0	X	X	X	X	X
English N = 23 $\bar{X}$ = 3.2560	0		0	0	0	0	0	0	X	X
Psychology N = 17 X = 3.2073	0	0		0	0	0	0	0	X	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.1133	0	0	0		0	0	0	0	0	0
Early Childhood Education N = 18 $\bar{X}$ = 3.0896	0	0	0	0		0	0	0	0	0
Mechanical Engineering N = 40 $\bar{X}$ = 3.0062	X	0	0	0	0		0	0	0	0
Secondary Education N = 26 $\bar{X}$ = 2.9985	X	0	0	0	0	0		0	0	0
Electrical Engineering N = 30 $\bar{X}$ = 2.9574	X	0	0	0	0	0	0		0	0
Elementary Education N = 37 $\bar{X}$ = 2.9414	X	X	X	0	0	0	0	0		0
Nursing N = 39 $\bar{X}$ = 2.8521	X	X	X	0	0	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-5

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-TOTAL FOR TEN MAJORS WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR AND USING SAT-TOTAL AS A COVARIATE

N = 224 X̄ = 3.0375	Microbiology	English	Psychology	Mathematical Sciences	Early Childhood Education	Mechanical Engineering	Electrical Engineering	Secondary Education	Elementary Education	Nursing
Microbiology N = 11 X̄ = 3.3103		0	0	0	0	0	X	X	X	X
English N = 21 X̄ = 3.2738	0		0	0	0	0	0	X	X	X
Psychology N = 16 X̄ = 3.2617	0	0		0	0	0	0	X	X	X
Mathematical Sciences N = 14 X̄ = 3.1133	0	0	0		0	0	0	0	0	0
Early Childhood Education N = 15 X̄ = 3.0806	0	0	0	0		0	0	0	0	0
Mechanical Engineering N = 34 X̄ = 3.0282	0	0	0	0	0		0	0	0	0
Electrical Engineering N = 25 X̄ = 3.0188	X	0	0	0	0	0		0	0	0
Secondary Education N = 23 X̄ = 2.9559	X	X	X	0	0	0	0		0	0
Elementary Education N = 31 X̄ = 2.8827	X	X	X	0	0	0	0	0		0
Nursing N = 35 X̄ = 2.8721	X	X	X	0	0	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-6

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-CORE FOR TEN MAJORS

N = 245 $\bar{X}$ = 2.8906	English	Microbiology	Psychology	Electrical Engineering	Secondary Education	Nursing	Early Childhood Education	Mechanical Engineering	Mathematical Sciences	Elementary Education
English N = 23 $\bar{X}$ = 3.3130		0	0	0	0	X	X	X	X	X
Microbiology N = 11 $\bar{X}$ = 3.2955	0		0	0	0	X	X	X	X	X
Psychology N = 16 $\bar{X}$ = 3.1994	0	0		0	0	0	0	X	X	X
Electrical Engineering N = 29 $\bar{X}$ = 2.9580	0	0	0		0	0	0	0	0	X
Secondary Education N = 24 $\bar{X}$ = 2.9514	0	0	0	0		0	0	0	0	X
Nursing N = 39 $\bar{X}$ = 2.8692	X	X	0	0	0		0	0	0	0
Early Childhood Education N = 18 $\bar{X}$ = 2.8556	X	X	0	0	0	0		0	0	0
Mechanical Engineering N = 36 $\bar{X}$ = 2.7644	X	X	X	0	0	0	0		0	0
Mathematical Sciences N = 14 $\bar{X}$ = 2.6905	X	X	X	0	0	0	0	0		0
Elementary Education N = 36 $\bar{X}$ = 2.5097	X	X	X	X	X	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-7

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-CORE FOR TEN MAJORS USING SAT-TOTAL AS A COVARIATE

N = 221 $\bar{X}$ = 2.8996	English	Microbiology	Psychology	Electrical Engineering	Secondary Education	Nursing	Early Childhood Education	Mechanical Engineering	Mathematical Sciences	Elementary Education
English N = 21 $\bar{X}$ = 3.3429		0	0	X	X	X	X	X	X	X
Microbiology N = 11 $\bar{X}$ = 3.2955	0		0	0	0	0	X	X	X	X
Psychology N = 16 $\bar{X}$ = 3.1994	0	0		0	0	0	X	X	X	X
Electrical Engineering N = 25 $\bar{X}$ = 2.9713	X	0	0		0	0	0	0	0	X
Secondary Education N = 22 $\bar{X}$ = 2.8788	X	0	0	0		0	0	0	0	0
Nursing N = 35 $\bar{X}$ = 2.8781	X	0	0	0	0		0	0	0	0
Early Childhood Education N = 15 $\bar{X}$ = 2.8133	X	X	X	0	0	0		0	0	0
Mechanical Engineering N = 32 $\bar{X}$ = 2.7974	X	X	X	0	0	0	0		0	0
Mathematical Sciences N = 14 $\bar{X}$ = 2.6905	X	X	X	0	0	0	0	0		0
Elementary Education N = 31 $\bar{X}$ = 2.5274	X	X	X	X	0	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-8

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-OTH REQ FOR TEN MAJORS

N = 255 $\bar{X}$ = 2.9469	Microbiology	English	Psychology	Mathematical Sciences	Electrical Engineering	Mechanical Engineering	Early Childhood Education	Secondary Education	Elementary Education	Nursing
Microbiology N = 12 $\bar{X}$ = 3.2335		0	0	0	0	0	0	X	X	X
English N = 23 $\bar{X}$ = 3.1867	0		0	0	0	0	0	0	0	X
Psychology N = 17 $\bar{X}$ = 3.1835	0	0		0	0	0	0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.0744	0	0	0		0	0	0	0	0	X
Electrical Engineering N = 30 $\bar{X}$ = 3.0548	0	0	0	0		0	0	0	0	X
Mechanical Engineering N = 40 $\bar{X}$ = 2.9507	0	0	0	0	0		0	0	0	0
Early Childhood Education N = 18 $\bar{X}$ = 2.9362	0	0	0	0	0	0		0	0	0
Secondary Education N = 26 $\bar{X}$ = 2.8567	X	0	0	0	0	0	0		0	0
Elementary Education N = 37 $\bar{X}$ = 2.8458	X	0	0	0	0	0	0	0		0
Nursing N = 39 $\bar{X}$ = 2.6428	X	X	X	X	X	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-9

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-OTH REQ FOR TEN MAJORS USING SAT-TOTAL AS A COVARIATE

N = 224 $\bar{X}$ = 2.9552	Microbiology	Psychology	English	Electrical Engineering	Mathematical Sciences	Mechanical Engineering	Early Childhood Education	Secondary Education	Elementary Education	Nursing
Microbiology N = 11 $\bar{X}$ = 3.2547		0	0	0	0	0	0	X	X	X
Psychology N = 16 $\bar{X}$ = 3.2522	0		0	0	0	0	0	X	X	X
English N = 21 $\bar{X}$ = 3.2157	0	0		0	0	0	0	X	X	X
Electrical Engineering N = 25 $\bar{X}$ = 3.1009	0	0	0		0	0	0	0	X	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.0744	0	0	0	0		0	0	0	0	X
Mechanical Engineering N = 34 $\bar{X}$ = 2.9678	0	0	0	0	0		0	0	0	0
Early Childhood Education N = 15 $\bar{X}$ = 2.9337	0	0	0	0	0	0		0	0	0
Secondary Education N - 23 $\bar{X}$ = 2.8166	X	X	X	0	0	0	0		0	0
Elementary Education N = 31 $\bar{X}$ = 2.7636	X	X	X	X	0	0	0	0		0
Nursing N = 35 $\bar{X}$ = 2.6749	X	X	X	X	X	0	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-10

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-ELEC FOR TEN MAJORS

N = 244 $\bar{X}$ = 3.0685	Microbiology	Nursing	Mechanical Engineering	Psychology	Mathematical Sciences	English	Electrical Engineering	Secondary Education	Early Childhood Education	Elementary Education
Microbiology N = 12 $\bar{X}$ = 3.6447		X	X	X	X	X	X	X	X	X
Nursing N = 37 $\bar{X}$ = 3.2493	X		0	0	0	0	0	0	X	X
Mechanical Engineering N = 40 $\bar{X}$ = 3.2161	X	0		0	0	0	0	0	X	X
Psychology N = 17 $\bar{X}$ = 3.2039	X	0	0		0	0	0	0	X	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.1107	X	0	0	0		0	0	0	0	X
English N = 23 $\bar{X}$ = 3.1092	X	0	0	0	0		0	0	0	X
Electrical Engineering N = 30 $\bar{X}$ = 3.0536	X	0	0	0	0	0		0	0	X
Secondary Education N = 25 $\bar{X}$ = 2.9115	X	0	0	0	0	0	0		0	0
Early Childhood Education N = 16 $\bar{X}$ = 2.7341	X	X	X	X	0	0	0	0		0
Elementary Education N = 31 $\bar{X}$ = 2.6293	X	X	X	X	X	X	X	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-11

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-ELEC FOR TEN MAJORS USING SAT-TOTAL AS A COVARIATE

N = 216 $\bar{X}$ = 3.0621	Microbiology	Nursing	Mechanical Engineering	Psychology	Electrical Engineering	Mathematical Sciences	English	Secondary Education	Early Childhood Education	Elementary Education
Microbiology N = 11 $\bar{X}$ = 3.6294		X	X	X	X	X	X	X	X	X
Nursing N = 34 $\bar{X}$ = 3.2419	X		0	0	0	0	0	0	X	X
Mechanical Engineering N = 34 $\bar{X}$ = 3.2130	X	0		0	0	0	0	0	X	X
Psychology N = 16 $\bar{X}$ = 3.1792	X	0	0		0	0	0	0	X	X
Electrical Engineering N = 25 $\bar{X}$ = 3.1561	X	0	0	0		0	0	0	X	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.1107	X	0	0	0	0		0	0	X	X
English N = 21 $\bar{X}$ = 3.0958	X	0	0	0	0	0		0	X	X
Secondary Education N = 22 $\bar{X}$ = 2.8588	X	0	0	0	0	0	0		0	0
Early Childhood Education N = 14 $\bar{X}$ = 2.6604	X	X	X	X	X	X	X	0		0
Elementary Education N = 26 $\bar{X}$ = 2.5623	X	X	X	X	X	X	X	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-12

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG FOR TEN MAJORS

N = 255 $\bar{X}$ = 3.2373	Secondary Education	Early Childhood Education	English	Elementary Education	Psychology	Mathematical Sciences	Microbiology	Mechanical Engineering	Nursing	Electrical Engineering
Secondary Education N = 26 $\bar{X}$ = 3.5799		0	0	0	0	X	X	X	X	X
Early Childhood Education N = 18 $\bar{X}$ = 3.5420	0		0	0	0	X	X	X	X	X
English N = 23 $\bar{X}$ = 3.4540	0	0		0	0	0	0	X	X	X
Elementary Education N = 37 $\bar{X}$ = 3.4478	0	0	0		0	0	0	X	X	X
Psychology N = 17 $\bar{X}$ = 3.3032	0	0	0	0		0	0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.2263	X	X	0	0	0		0	0	0	X
Microbiology N = 12 $\bar{X}$ = 3.2065	X	X	0	0	0	0		0	0	X
Mechanical Engineering N = 40 $\bar{X}$ = 3.0370	X	X	X	X	0	0	0		0	0
Nursing N = 39 $\bar{X}$ = 3.0297	X	X	X	X	0	0	0	0		0
Electrical Engineering N = 30 $\bar{X}$ 2.8489	X	X	X	X	X	X	X	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-13

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG FOR TEN MAJORS USING SAT-TOTAL AS A COVARIATE

N = 224 $\bar{X}$ = 3.2621	Early Childhood Education	Secondary Education	English	Elementary Education	Psychology	Mathematical Sciences	Microbiology	Mechanical Engineering	Nursing	Electrical Engineering
Early Childhood Education N = 15 $\bar{X}$ = 3.6043		0	0	0	0	X	X	X	X	X
Secondary Education N = 23 $\bar{X}$ = 3.5639	0		0	0	0	X	X	X	X	X
English N = 21 $\bar{X}$ = 3.4650	0	0		0	0	0	0	X	X	X
Elementary Education N = 31 $\bar{X}$ = 3.4577	0	0	0		0	0	0	X	X	X
Psychology N = 16 $\bar{X}$ = 3.3653	0	0	0	0		0	0	X	X	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.2263	X	X	0	0	0		0	0	0	X
Microbiology N = 11 $\bar{X}$ = 3.1962	X	X	0	0	0	0		0	0	X
Mechanical Engineering N = 34 $\bar{X}$ = 3.0728	X	X	X	X	X	0	0		0	0
Nursing N = 35 $\bar{X}$ = 3.0495	X	X	X	X	X	0	0	0		0
Electrical Engineering N = 25 $\bar{X}$ = 2.9041	X	X	X	X	X	X	X	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-14

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG FOR TEN MAJORS WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR

N = 255 $\bar{X}$ = 3.2248	Secondary Education	Early Childhood Education	English	Elementary Education	Psychology	Mathematical Sciences	Microbiology	Mechanical Engineering	Nursing	Electrical Engineering
Secondary Education N = 26 $\bar{X}$ = 3.5783		0	0	0	0	X	X	X	X	X
Early Childhood Education N = 18 $\bar{X}$ = 3.4987	0		0	0	0	0	0	X	X	X
English N = 23 $\bar{X}$ = 3.4540	0	0		0	0	0	0	X	X	X
Elementary Education N = 37 $\bar{X}$ = 3.3832	0	0	0		0	0	0	X	X	X
Psychology N = 17 $\bar{X}$ = 3.3032	0	0	0	0		0	0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.2263	X	0	0	0	0		0	0	0	X
Microbiology N = 12 $\bar{X}$ = 3.2065	X	0	0	0	0	0		0	0	X
Mechanical Engineering N = 40 $\bar{X}$ = 3.0370	X	X	X	X	0	0	0		0	0
Nursing N = 39 $\bar{X}$ = 3.0297	X	X	X	X	0	0	0	0		0
Electrical Engineering N = 30 $\bar{X}$ = 2.8489	X	X	X	X	X	X	X	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-15

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG FOR TEN MAJORS WITH STUDENT TEACHING GRADE REMOVED FROM EDUCATION MAJORS' GPR AND USING SAT-TOTAL AS A COVARIATE

N = 224 $\bar{X}$ = 3.2456	Secondary Education	Early Childhood Education	English	Elementary Education	Psychology	Mathematical Sciences	Microbiology	Mechanical Engineering	Nursing	Electrical Engineering
Secondary Education N = 23 $\bar{X}$ = 3.5598		0	0	0	0	X	X	X	X	X
Early Childhood Education N = 15 $\bar{X}$ = 3.5327	0		0	0	0	X	X	X	X	X
English N = 21 $\bar{X}$ = 3.4650	0	0		0	0	0	0	X	X	X
Elementary Education N = 31 $\bar{X}$ = 3.3754	0	0	0		0	0	0	X	X	X
Psychology N = 16 $\bar{X}$ = 3.3653	0	0	0	0		0	0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.2263	X	X	0	0	0		0	0	0	X
Microbiology N = 11 $\bar{X}$ = 3.1962	X	X	0	0	0	0		0	0	X
Mechanical Engineering N = 34 $\bar{X}$ = 3.0728	X	X	X	X	0	0	0		0	0
Nursing N = 35 $\bar{X}$ = 3.0495	X	X	X	X	0	0	0	0		0
Electrical Engineering N = 25 $\bar{X}$ = 2.9043	X	X	X	X	X	X	X	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-16

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG COMPUTED ON 300-400 LEVEL MAJOR COURSES FOR TEN MAJORS USING SAT-TOTAL AS A COVARIATE

N = 224 $\bar{X}$ = 3.2471	Early Childhood Education	Secondary Education	English	Elementary Education	Psychology	Microbiology	Mathematical Sciences	Mechanical Engineering	Nursing	Electrical Engineering
Early Childhood Education N = 15 $\bar{X}$ = 3.5993		0	0	0	0	X	X	X	X	X
Secondary Education N = 23 $\bar{X}$ = 3.5504	0		0	0	0	X	X	X	X	X
English N = 21 $\bar{X}$ = 3.4568	0	0		0	0	0	X	X	X	X
Elementary Education N = 31 $\bar{X}$ = 3.4486	0	0	0		0	0	X	X	X	X
Psychology N = 16 $\bar{X}$ = 3.3935	0	0	0	0		0	X	X	X	X
Microbiology N = 11 $\bar{X}$ = 3.1938	X	X	0	0	0		0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.0843	X	X	X	X	X	0		0	0	0
Mechanical Engineering N = 34 $\bar{X}$ = 3.0593	X	X	X	X	X	0	0		0	0
Nursing N = 35 $\bar{X}$ = 3.0553	X	X	X	X	X	0	0	0		0
Electrical Engineering N = 25 $\bar{X}$ = 2.8759	X	X	X	X	X	X	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-17

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG COMPUTED ON 300-400 LEVEL MAJOR COURSES FOR TEN MAJORS WITH STUDENT TEACHING REMOVED FROM EDUCATION MAJORS' GPR

N = 255 $\bar{X}$ = 3.2089	Secondary Education	Early Childhood Education	English	Elementary Education	Psychology	Microbiology	Mathematical Sciences	Nursing	Mechanical Engineering	Electrical Engineering
Secondary Education N = 26 $\bar{X}$ = 3.5579		0	0	0	0	X	X	X	X	X
Early Childhood Education N = 18 $\bar{X}$ = 3.4909	0		0	0	0	0	X	X	X	X
English N = 23 $\bar{X}$ = 3.4466	0	0		0	0	0	X	X	X	X
Elementary Education N = 37 $\bar{X}$ = 3.3697	0	0	0		0	0	0	X	X	X
Psychology N = 17 $\bar{X}$ = 3.3397	0	0	0	0		0	0	X	X	X
Microbiology N = 12 $\bar{X}$ = 3.2019	X	0	0	0	0		0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.0843	X	X	X	0	0	0		0	0	0
Nursing N = 39 $\bar{X}$ = 3.0323	X	X	X	X	X	0	0		0	0
Mechanical Engineering N = 40 $\bar{X}$ = 3.0176	X	X	X	X	X	0	0	0		0
Electrical Engineering N = 30 $\bar{X}$ = 2.8280	X	X	X	X	X	X	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

MATRIX E-18

DUNCAN'S MULTIPLE RANGE TEST COMPARING GPR-PROG COMPUTED ON 300-400 LEVEL MAJOR COURSES FOR TEN MAJORS WITH STUDENT TEACHING REMOVED FROM EDUCATION MAJORS' GPR AND USING SAT-TOTAL AS A COVARIATE

N = 224 $\bar{X}$ = 3.2287	Secondary Education	Early Childhood Education	English	Psychology	Elementary Education	Microbiology	Mathematical Sciences	Mechanical Engineering	Nursing	Electrical Engineering
Secondary Education N = 23 $\bar{X}$ = 3.5385		0	0	0	0	X	X	X	X	X
Early Childhood Education N = 15 $\bar{X}$ = 3.5251	0		0	0	0	X	X	X	X	X
English N = 21 $\bar{X}$ = 3.4568	0	0		0	0	0	X	X	X	X
Psychology N = 16 $\bar{X}$ = 3.3935	0	0	0		0	0	X	X	X	X
Elementary Education N = 31 $\bar{X}$ = 3.3598	0	0	0	0		0	X	X	X	X
Microbiology N = 11 $\bar{X}$ = 3.1938	X	X	0	0	0		0	0	0	X
Mathematical Sciences N = 14 $\bar{X}$ = 3.0843	X	X	X	X	X	0		0	0	0
Mechanical Engineering N = 34 $\bar{X}$ = 3.0593	X	X	X	X	X	0	0		0	0
Nursing N = 35 $\bar{X}$ = 3.0553	X	X	X	X	X	0	0	0		0
Electrical Engineering N = 25 $\bar{X}$ = 2.8759	X	X	X	X	X	X	0	0	0	

KEY: 0 = No statistically significant difference between majors.
X = Statistically significant difference between majors.

APPENDIX F

T-TEST TABLES

Appendix F

T-TEST PROCEDURE COMPARING GPR-PROG WITH GPR FOR NON-PROGRAM COURSES FOR TEN MAJORS

Early Childhood Education

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	18	3.542	0.29243	34 (26.8)	-4.6775	0.0001
Non-Prog	18	2.885	0.51895			

Electrical Engineering

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	30	2.8488	0.52992	58	1.5207	0.1333
Non-Prog	30	3.0375	0.42544			

Elementary Education

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	37	3.4478	0.33080	72 (58.9)	-6.5330	0.0001
Non-Prog	37	2.7569	0.55170			

English

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	23	3.4540	0.29350	44	-2.9002	0.0058
Non-Prog	23	3.1751	0.35570			

Microbiology

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	12	3.2065	0.49417	22	0.8347	0.4138
Non-Prog	12	3.3522	0.34826			

Mechanical Engineering

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	40	3.0369	0.51652	78	-0.3570	0.7221
Non-Prog	40	2.9959	0.51052			

Mathematical Sciences

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	14	3.2262	0.57613	26	-0.8798	0.3870
Non-Prog	14	3.0403	0.54189			

Nursing

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	39	3.0297	0.37530	76	-3.0941	0.0028
Non-Prog	39	2.7516	0.41750			

Psychology

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	17	3.3032	0.43159	32	-0.9155	0.3668
Non-Prog	17	3.1664	0.43996			

Secondary Education

Group	N	$\bar{X}$	SD	DF	T	Prob > T
Prog	26	3.5799	0.39329	50	-5.4059	0.0001
Non-Prog	26	2.8725	0.53904			

APPENDIX G

TABLES COMPARING RELATIVE INFLATION-DEFLATION INDICES

Appendix G-1

Significant and Insignificant Inflation-Deflation Indices For Each Major

	Significant Inflation	No Significant Inflation	No Significant Deflation	Significant Deflation
Early Childhood	+4	+3	-a	-a
Electrical Engineering	-b	-b	-5	-6
Elementary Education	+3	+2	-1	-c
English	-d	+5	-2	-3
Math	-d	+3	-2	-3
Mechanical Engineering	-d	+2	-3	-4
Microbiology	-d	+1	-4	-5
Nursing	+3	+2	-2	-c
Psychology	-d	+4	-1	-2
Secondary Education	+2	+1	-3	-c

[a] A Rank of 10 on SAT-Total will not allow for any deflation.
[b] A Rank of 1 on SAT-Total will not allow for any inflation.
[c] The SAT rank would not allow for an RIDI to be computed for this category.
[d] None of these majors were statistically different from each other on SAT-Total, therefore any increase would be insignificant.

Appendix G-2

Relative Inflation-Deflation Indices

Early Childhood

ANOVA	SAT Rank	GPR Rank	GPR RIDI	CORE Rank	CORE RIDI	OTH REQ Rank	OTH REQ RIDI	ELEC Rank	ELEC RIDI	PROG Rank	PROG RIDI
Total	10	4	+6*	7	+3	7	+3	9	+1	2	+8*
Student Teaching Removed	10	5	+5*	-	-	-	-	-	-	2	+8*
300-400 W/Student Teaching Removed	10	-	-	-	-	-	-	-	-	2	+8*
ANOCOVA											
Total	10	4	+6*	7	+3	7	+3	9	+1	1	+9*
Student Teaching Removed	10	5	+5*	-	-	-	-	-	-	2	+8*
300-400	10	-	-	-	-	-	-	-	-	1	+9*
300-400 W/Student Teaching Removed	10	-	-	-	-	-	-	-	-	2	+8*

*significant inflation

Appendix G-3

Relative Inflation-Deflation Indices

Electrical Engineering

	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
ANOVA	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	1	9	-8*	4	-3	5	-4	7	-6*	10	-9*
Student Teaching Removed	1	8	-7*	-	-	-	-	-	-	10	-9*
300-400 W/Student Teaching Removed	1	-	-	-	-	-	-	-	-	10	-9*
ANOCOVA											
Total	1	7	-6*	4	-3	4	-3	5	-4	10	-9*
Student Teaching Removed	1	7	-6*	-	-	-	-	-	-	10	-9*
300-400	1	-	-	-	-	-	-	-	-	10	-9*
300-400 W/Student Teaching Removed	1	-	-	-	-	-	-	-	-	10	-9*

* significant deflation

Appendix G-4
Relative Inflation-Deflation Indices

Elementary Education

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	9	7	+2	10	-1	9	0	10	-1	4	+5*
Student Teaching Removed	9	9	0	-	-	-	-	-	-	4	+5*
300-400 W/Student Teaching Removed	9	-	-	-	-	-	-	-	-	4	+5*
ANOCOVA											
Total	9	9	0	10	-1	9	0	10	-1	4	+5*
Student Teaching Removed	9	9	0	-	-	-	-	-	-	4	+5*
300-400	9	-	-	-	-	-	-	-	-	4	+5*
300-400 W/Student Teaching Removed	9	-	-	-	-	-	-	-	-	5	+4*

*significant inflation

Appendix G-5

Relative Inflation-Deflation Indices

English

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	6	2	+4	1	+5	2	+4	6	0	3	+3
Student Teaching Removed	6	2	+4	-	-	-	-	-	-	3	+3
300-400 W/Student Teaching Removed	6	-	-	-	-	-	-	-	-	3	+3
ANOCOVA											
Total	6	2	+4	1	+5	3	+3	7	-1	3	+3
Student Teaching Removed	6	2	+4	-	-	-	-	-	-	3	+3
300-400	6	-	-	-	-	-	-	-	-	3	+3
300-400 W/Student Teaching Removed	6	-	-	-	-	-	-	-	-	3	+3

Appendix G-6

Relative Inflation-Deflation Indices

Mathematical Sciences

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	4	5	-1	9	-5*	4	0	5	-1	6	-2
Student Teaching Removed	4	4	0	-	-	-	-	-	-	6	-2
300-400 W/Student Teaching Removed	4	-	-	-	-	-	-	-	-	7	-3*
ANOCOVA											
Total	4	5	-1	9	-5*	5	-1	6	-2	6	-2
Student Teaching Removed	4	4	0	-	-	-	-	-	-	6	-2
300-400	4	-	-	-	-	-	-	-	-	7	-3*
300-400 W/Student Teaching Removed	4	-	-	-	-	-	-	-	-	7	-3*

*significant deflation

Appendix G-7

Relative Inflation-Deflation Indices

Mechanical Engineering

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	3	8	-5*	8	-5*	6	-3	3	0	8	-5*
Student Teaching Removed	3	6	-3	-	-	-	-	-	-	8	-5*
300-400 W/Student Teaching Removed	3	-	-	-	-	-	-	-	-	9	-6*
ANOCOVA											
Total	3	6	-3	8	-5*	6	-3	3	0	8	-5*
Student Teaching Removed	3	6	-3	-	-	-	-	-	-	8	-5*
300-400	3	-	-	-	-	-	-	-	-	8	-5*
300-400 W/Student Teaching Removed	3	-	-	-	-	-	-	-	-	8	-5*

*significant deflation

Appendix G-8

Relative Inflation-Deflation Indices

Microbiology

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	2	1	+1	2	0	1	+1	1	+1	7	-5*
Student Teaching Removed	2	1	+1	-	-	-	-	-	-	7	-5*
300-400 W/Student Teaching Removed	2	-	-	-	-	-	-	-	-	6	-4
ANOCOVA											
Total	2	1	+1	2	0	1	+1	1	+1	7	-5*
Student Teaching Removed	2	1	+1	-	-	-	-	-	-	7	-5*
300-400	2	-	-	-	-	-	-	-	-	6	-4
300-400 W/Student Teaching Removed	2	-	-	-	-	-	-	-	-	6	-4

*significant deflation

Appendix G-9

Relative Inflation-Deflation Indices

Nursing

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	8	9	-1	6	+2	10	-2	2	+6*	9	-1
Student Teaching Removed	8	10	-2	-	-	-	-	-	-	9	-1
300-400 W/Student Teaching Removed	8	-	-	-	-	-	-	-	-	8	0
ANOCOVA											
Total	8	9	-1	6	+2	10	-2	2	+6*	9	-1
Student Teaching Removed	8	10	-2	-	-	-	-	-	-	9	-1
300-400	8	-	-	-	-	-	-	-	-	9	-1
300-400 W/Student Teaching Removed	8	-	-	-	-	-	-	-	-	9	-1

*significant inflation

Appendix G-10
Relative Inflation-Deflation Indices

Psychology

	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
ANOVA	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	5	3	+2	3	+2	3	+2	4	+1	5	0
Student Teaching Removed	5	3	+2	-	-	-	-	-	-	5	0
300-400 W/Student Teaching Removed	5	-	-	-	-	-	-	-	-	5	0
ANOCOVA											
Total	5	3	+2	3	+2	2	+3	4	+1	5	0
Student Teaching Removed	5	3	+2	-	-	-	-	-	-	5	0
300-400	5	-	-	-	-	-	-	-	-	5	0
300-400 W/Student Teaching Removed	5	-	-	-	-	-	-	-	-	4	+1

Appendix G-11

Relative Inflation-Deflation Indices

Secondary Education

ANOVA	SAT	GPR		CORE		OTH REQ		ELEC		PROG	
	Rank	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI	Rank	RIDI
Total	7	6	+1	5	+2*	8	-1	8	-1	1	+6*
Student Teaching Removed	7	7	0	-	-	-	-	-	-	1	+6*
300-400 W/Student Teaching Removed	7	-	-	-	-	-	-	-	-	1	+6*
ANOCOVA											
Total	7	8	-1	5	+2*	8	-1	8	-1	2	+5*
Student Teaching Removed	7	8	-1	-	-	-	-	-	-	1	+6*
300-400	7	-	-	-	-	-	-	-	-	2	+5*
300-400 W/Student Teaching Removed	7	-	-	-	-	-	-	-	-	1	+6*

*significant inflation

APPENDIX H

TABLES COMPARING NUMBER OF TIMES EACH MAJOR HAD GPR MEANS HIGHER, LOWER, OR NOT DIFFERENT FROM OTHER MAJORS

TABLE H-1

Number Of Times Each Major Had Means On GPR-Total, GPR-Core, GPR-Oth Req, GPR-Elec, and GPR-Prog Which Were Significantly Higher, Lower, or Not Different When Compared to the Other Nine Majors (Anocova)

MAJOR	#Of Means Significantly Higher			#Of Means Significantly Lower			#Of Means Not Different		
	No.	Rank	Row %	No.	Rank	Row %	No.	Rank	Row %
Early Childhood Education	6	4	13.3	10	3	22.2	29	6	64.5
Electrical Engineering	5	5	11.1	10	3	22.2	30	4	66.7
Elementary Education	4	7	9.0	18	1	40.0	23	9	51.0
English	17	2	37.8	1	9	2.2	27	7	45.0
Microbiology	22	1	49.0	3	8	6.6	20	10	44.4
Mathematical Sciences	4	7	9.0	6	6	13.3	35	1	77.7
Mechanical Engineering	4	7	9.0	8	5	17.7	33	3	73.3
Nursing	2	10	4.4	16	2	35.6	27	7	60.0
Psychology	14	3	31.1	1	9	2.2	30	4	66.7
Secondary Education	5	5	11.1	6	6	13.3	34	2	75.6

TABLE H-2

COMPARISON OF EARLY CHILDHOOD EDUCATION WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Electrical Engineering	1	1	3
Elementary Education	0	0	5
English	0	2	3
Microbiology	1	2	2
Mechanical Engineering	1	1	3
Mathematical Sciences	1	1	3
Nursing	2	1	2
Psychology	0	2	3
Secondary Education	0	0	5
Totals	6	10	29

TABLE H-3

COMPARISON OF ELECTRICAL ENGINEERING WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Time Significantly Lower Than	#Times No Different From
Early Childhood Education	1	1	3
Elementary Education	3	1	1
English	0	2	3
Microbiology	0	3	2
Mechanical Engineering	0	0	5
Mathematical Sciences	0	1	4
Nursing	1	0	4
Psychology	0	1	4
Secondary Education	0	1	4
Totals	5	10	30

TABLE H-4

COMPARISON OF ELEMENTARY EDUCATION WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	0	0	5
Electrical Engineering	1	3	1
English	0	4	1
Microbiology	1	4	0
Mechanical Engineering	1	1	3
Mathematical Sciences	0	1	4
Nursing	1	1	3
Psychology	0	4	1
Secondary Education	0	0	5
Totals	4	18	23

TABLE H-5

COMPARISON OF ENGLISH WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST

(ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	2	0	3
Electrical Engineering	2	0	3
Elementary Education	4	0	1
Microbiology	0	1	4
Mechanical Engineering	2	0	3
Mathematical Sciences	1	0	4
Nursing	4	0	1
Psychology	0	0	5
Secondary Education	2	0	3
Totals	17	1	27

TABLE H-6

COMPARISON OF MICROBIOLOGY WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	2	1	2
Electrical Engineering	3	0	2
Elementary Education	4	1	0
English	1	0	4
Mechanical Engineering	3	0	2
Mathematical Sciences	2	0	3
Nursing	3	0	2
Psychology	1	0	4
Secondary Education	3	1	1
Totals	22	3	20

TABLE H-7

COMPARISON OF MATHEMATICAL SCIENCES WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	1	1	3
Electrical Engineering	1	0	4
Elementary Education	1	0	4
English	0	1	4
Microbiology	0	2	3
Mechanical Engineering	0	0	5
Nursing	1	0	4
Psychology	0	1	4
Secondary Education	0	1	4
Totals	4	6	35

TABLE H-8

COMPARISON OF MECHANICAL ENGINEERING WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	1	1	3
Electrical Engineering	0	0	5
Elementary Education	1	1	3
English	2	0	3
Microbiology	0	3	2
Mathematical Sciences	0	0	5
Nursing	0	0	5
Psychology	0	2	3
Secondary Education	0	1	4
Totals	4	8	33

TABLE H-9

COMPARISON OF NURSING WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	1	2	2
Electrical Engineering	0	1	4
Elementary Education	1	1	3
English	0	4	1
Microbiology	0	3	2
Mechanical Engineering	0	0	5
Mathematical Sciences	0	1	4
Psychology	0	3	2
Secondary Education	0	1	4
Totals	2	16	27

TABLE H-10

COMPARISON OF PSYCHOLOGY WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	2	0	3
Electrical Engineering	1	0	4
Elementary Education	4	0	1
English	0	0	5
Microbiology	0	1	4
Mechanical Engineering	2	0	3
Mathematical Sciences	1	0	4
Nursing	3	0	2
Secondary Education	1	0	4
Totals	14	1	30

TABLE H-11

COMPARISON OF SECONDARY EDUCATION WITH OTHER NINE MAJORS ON GPR-TOTAL, GPR-CORE, GPR-OTH REQ, GPR-ELEC, GPR-PROG BASED ON DUNCAN'S MULTIPLE RANGE TEST (ANOCOVA)

	#Times Significantly Higher Than	#Times Significantly Lower Than	#Times No Different From
Early Childhood Education	0	0	5
Electrical Engineering	1	0	4
Elementary Education	0	0	5
English	0	2	3
Microbiology	1	3	1
Mechanical Engineering	1	0	4
Mathematical Sciences	1	0	4
Nursing	1	0	4
Psychology	0	1	4
Totals	5	6	34